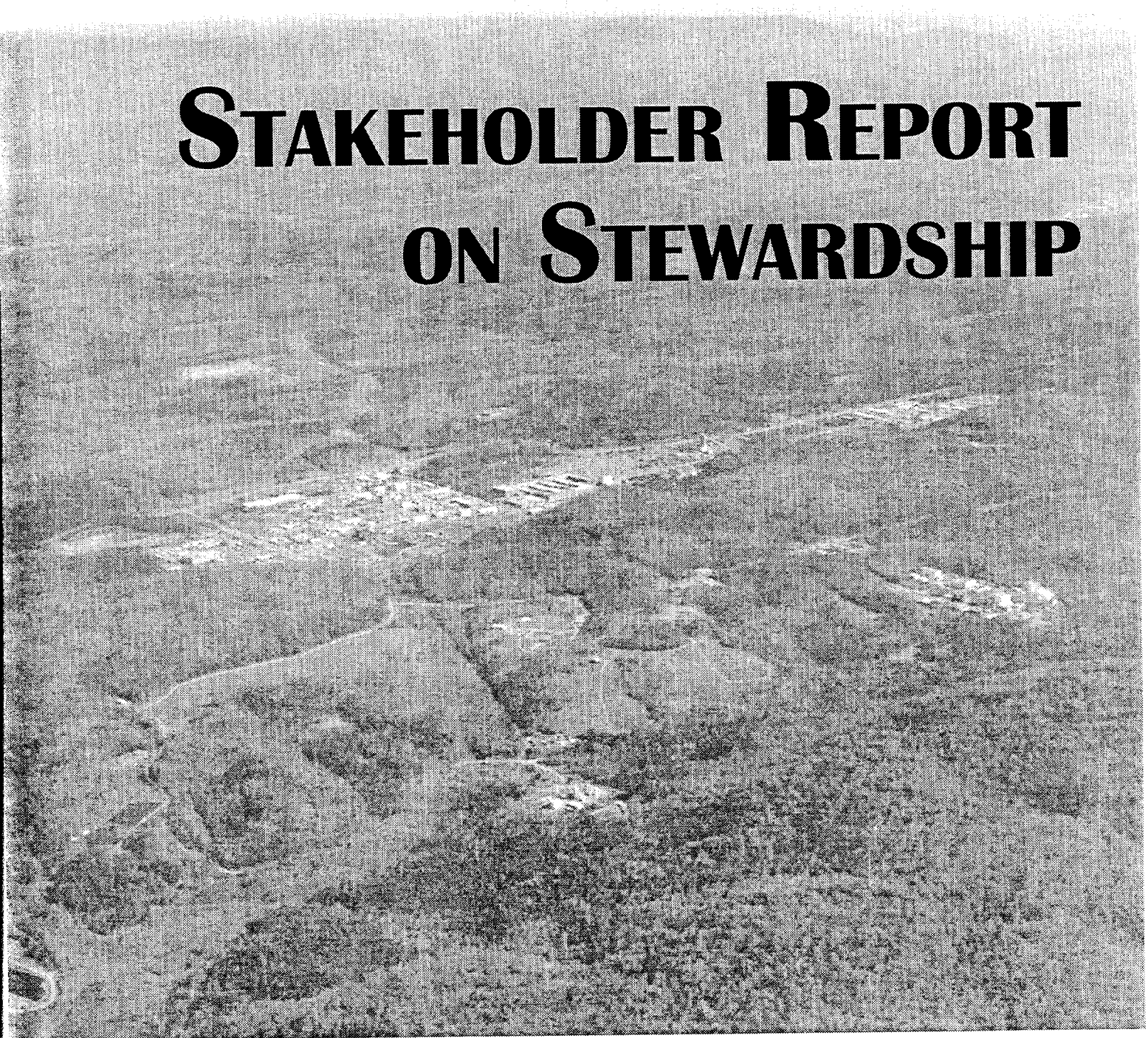
The Oak Ridge Reservation

STAKEHOLDER REPORT ON STEWARDSHIP



OAK RIDGE RESERVATION
END USE
WORKING GROUP

July, 1998

This report was written and edited by members of
the Stewardship Committee
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1.0 INTRODUCTION

This report describes the need for and the basic elements of a stewardship program, its application to contaminated areas on the Department of Energy (DOE) Oak Ridge Reservation (the Reservation), and the roles and responsibilities of stakeholders.[1] At present, this stewardship program applies to the DOE Oak Ridge Operation's Environmental Management Program. However, it is hoped that other DOE programs and facilities will recognize its value and apply the concepts of stewardship to their activities.

The End Use Working Group (EUWG) Stewardship Committee in collaboration with the Stewardship Committee from the Friends of Oak Ridge National Laboratory (herein referred to as the Stewardship Committee) prepared this report. It should be noted that the Stewardship Committee expects the federal government to fulfill its moral, legal and financial obligations for remediation and long-term stewardship for the Oak Ridge Reservation.

1.1 WHAT IS STEWARDSHIP?

The EUWG Stewardship Committee defines "stewardship" of remediated sites with residual contamination as:

"Acceptance of the responsibility and the implementation of activities necessary to maintain long-term protection of human health and of the environment from hazards posed by residual radioactive and chemically hazardous materials."

"Stewardship," as used in this report, should not be confused with the general meaning of the word (i.e., responsibility for the careful use of resources). This report applies stewardship to environmental remediation of contaminated areas on the Oak Ridge Reservation. Other stewardship issues at the Oak Ridge Reservation, such as the responsibility for storage of highly enriched uranium or cylinders of depleted uranium hexafluoride, are not considered in this report.

Stewardship in the general sense is not a new concept. Since the dawn of civilization, whenever people have gathered to organize societies, systems of stewardship have developed. For example, governments have preserved the rights

[1] For purposes of this report, a stakeholder is defined as an individual, organization, or other entity that has an interest in what happens to the Oak Ridge Reservation and other Department of Energy facilities. Similar individuals and groups in communities surrounding sites receiving waste from Oak Ridge are also stakeholders, since they would be affected by waste disposal decisions at the Oak Ridge Reservation.

of property use and ownership for centuries through the use of titles on real property. In another example, the National Park Service practices stewardship by purchasing and managing lands with unique natural and cultural histories for the benefit of current and future generations.

1.2 REASONS FOR STEWARDSHIP

Many DOE facilities have radioactive and chemically toxic contamination resulting from more than 50 years of nuclear research and weapons production. Some of the contaminants are persistent in the environment and are hazardous. Returning all contaminated areas to pristine conditions is often not feasible; it is risky for excavation and transportation workers; impractical for cost, technical, and logistical reasons; and does not always result in risk reduction. Furthermore, citizens and governments of the affected areas often oppose the transport and off-site disposal of contaminated materials. When contaminated materials are disposed off-site, the responsibility for stewardship is merely transferred from the waste-shipping facility to the waste-receiving facility.

It has become increasingly apparent that some level of contamination will remain on the Oak Ridge Reservation and that a stewardship program is essential for protection of the public and the environment from future risks associated with residual contamination. However, long-term stewardship is not a substitute for remediation that is technologically possible and currently feasible. Neither is stewardship to be used as a shield to avoid the costs of risk reduction in the near term. The goal of the DOE Environmental Management Program always should be to clean up contaminated areas to the extent practical.

1.3 STEWARDSHIP COMMITTEE GOALS

During deliberations regarding future uses of contaminated areas on the Oak Ridge Reservation, the EUWG realized that safe management of residual contaminants following remediation is dependent on effective stewardship. (See Appendix A for an overview of the EUWG.) Members of the EUWG cannot support Records of Decision that result in residual contamination unless a legally binding stewardship program is developed.

In order to examine the fundamental concepts of stewardship, the Stewardship Committee (see Appendix B for a list of Stewardship Committee participants) established five goals:

- Identify essential elements of effective stewardship;
- Develop long-term stewardship requirements for the Oak Ridge Reservation;
- Identify options and promote the acquisition of adequate long-term funding for stewardship on the Oak Ridge Reservation;

- Promote public understanding of stewardship; and
- Promote interaction concerning stewardship among individuals and governments.

This Stewardship Report documents these efforts and presents conclusions of the Stewardship Committee. Section 2 presents the attributes and basic elements of a long-term stewardship program. Section 3 describes the current and proposed statutory provisions for stewardship and institutional controls. Section 4 explains why the Oak Ridge Reservation requires stewardship. Section 5 presents detailed recommendations for an Oak Ridge Reservation stewardship program, including categories of stewards, physical controls, institutional controls, information systems, research, and funding options.

2.0 UNDERSTANDING STEWARDSHIP

This section presents the attributes and elements of a long-term stewardship program as developed by the Stewardship Committee. In contrast to a recent report by Probst and McGovern[2] which has a broad national perspective and analyzes policy options for managing stewardship at DOE facilities, this report emphasizes concurrent planning for remediation and stewardship; incorporation of stewardship requirements in CERCLA[3] Records of Decision and other CERCLA documents; integration of stewardship requirements into existing government systems; and a local stakeholder focus.

2.1 ATTRIBUTES OF SUCCESSFUL STEWARDSHIP

For stewardship to be successful, planning must be undertaken concurrently with remediation. Remediation includes removal, treatment and control of the spread of contamination. Once remediation is implemented, stewardship becomes the means of ensuring long-term protection of human health and the environment. Successful stewardship programs must possess three fundamental attributes: responsibility, long-term effectiveness, and adaptability.

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[2] Probst, K. and M. McGovern. 1998. Long-Term Stewardship and the Nuclear Weapons Complex: The Challenge Ahead. Center for Risk Management, Resources for the Future.

[3] Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as Superfund.

2.1.1 Responsibility

Stewardship of contaminated sites requires that society be willing to accept responsibility for providing a healthy and safe environment for current and future generations. The President and Congress, in their roles as protectors of the public interest, must recognize and accept this responsibility and provide long-term funding to minimize the risks associated with contaminated federal facilities. Stakeholders, local governments, regulators, and other decision-makers must work together to develop and implement a stewardship program aimed at reducing risks to human health and the environment that may result from residual contamination. Each of these groups must accept responsibility for stewardship.

2.1.2 Long-Term Effectiveness

Stewardship programs must be designed to protect human health and the environment for the lifetime of the contaminants, even when contamination is expected to be hazardous for thousands of years. If stewardship fails, so does remediation. To increase the probability of effectiveness over the long term, a stewardship program must employ redundant systems and controls, and appropriate contingency plans must be developed to address unanticipated adverse events. In addition, there must be stable funding and a legal basis for long-term stewardship. To provide a legal basis for stewardship, requirements must be specified in CERCLA Feasibility Studies, Records of Decision, and subsequent implementation documents. We do not know what society will be like hundreds and thousands of years from now when some of the wastes still may be hazardous. Therefore, the recommendations in this report, of necessity, are based on our knowledge of current societal and technical conditions and limited projections.

2.1.3 Adaptability

Stewardship programs must be adaptable to changing physical conditions and political demands in order to provide effective ongoing protection of human health and the environment. Advances in technology, changes in contaminant and environmental conditions, and demographics will necessitate periodic evaluation and refinement of stewardship activities. Stewardship programs must be flexible enough to accommodate such adjustments. (See Appendix C for a case study illustrating how radioactive decay might affect stewardship.)

2.2 ELEMENTS OF STEWARDSHIP

There are seven basic elements of an effective stewardship program:

- Authority and Funding;
- Stewards;

- Operations;
- Physical Controls;
- Institutional Controls;
- Information Systems;
- Research.

Figure 2.1 illustrates how stewardship should be organized and how each of these elements interrelate. At the highest level, the authority and funding for stewardship must be established. Next, the stewards must be identified and their individual roles and responsibilities for carrying out the operations of stewardship must be defined. The tools of stewardship include institutional controls, physical controls, information systems and research. Ultimately, all of these elements must work together.

2.2.1 Authority and Funding

At the beginning of any stewardship program, clear authority and responsibility must be established to ensure the long-term implementation of programs to protect human health and the environment. At federal facilities, this authority originates in the U.S. Congress and is delegated to an appropriate federal entity.

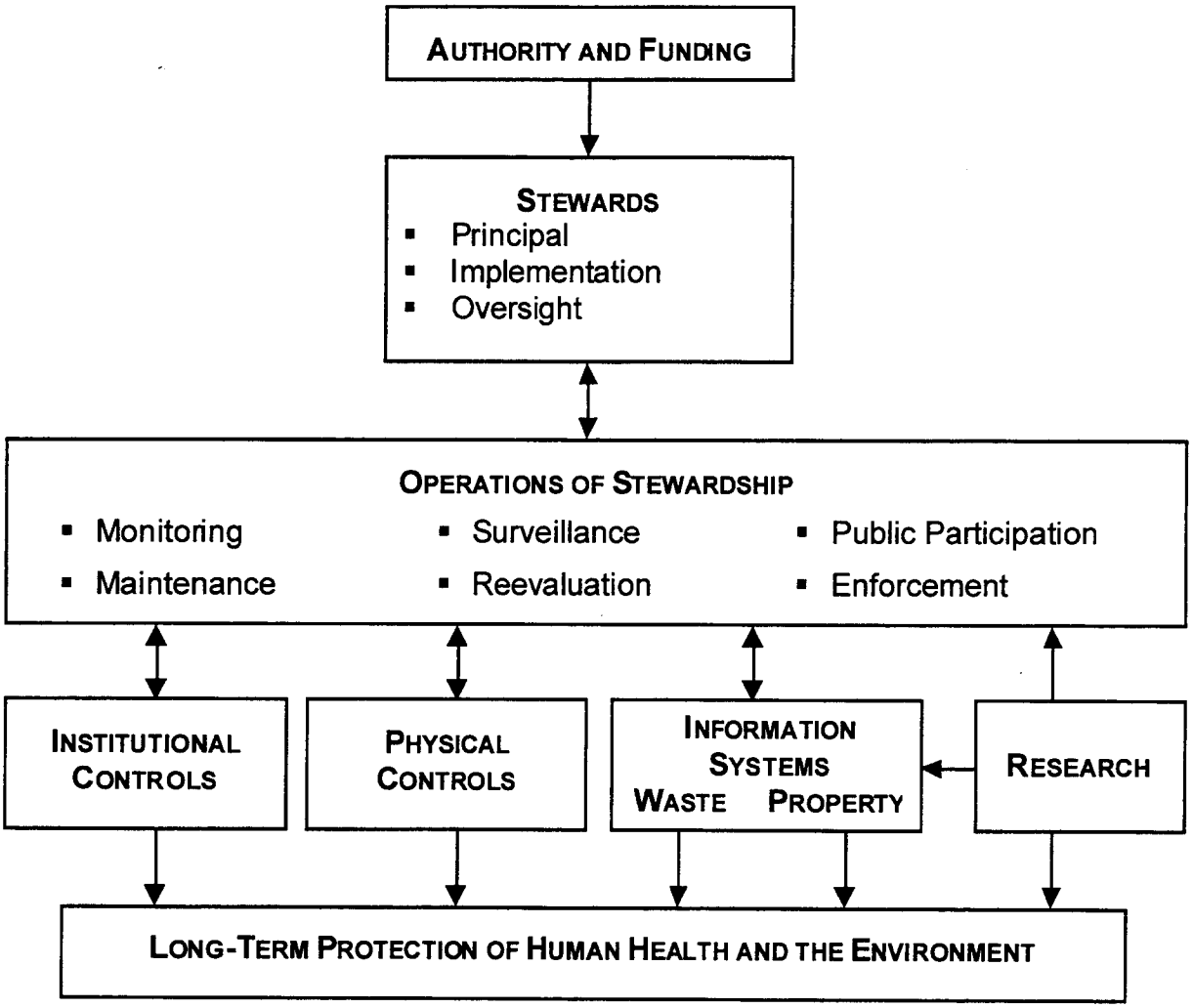
Reliable long-term funding is critical to the success of stewardship because competent sustainable stewardship is impossible without financial support. The annual appropriation process used for funding most government programs will be used to fund stewardship in the near term but may not provide the best source of funding over the long term.

Stewards responsible for operations (i.e., implementation stewards) must have access to funds, and support must be provided for oversight. Options for long-term funding are discussed below, and may be used in combination.

Designated Agency: The U.S. Congress could designate a government agency or a public-private partnership that would be funded by Congress to conduct stewardship activities throughout the country. Either of these options would offer great visibility to the operation, and the funding for stewardship would not compete with other agency programs. However, it would still be subject to the common constraints of government agencies and to the annual appropriation cycle. A stable long-term budget would not be guaranteed.

Entitlement: The federal government could designate funding necessary for stewardship as an entitlement similar to Social Security benefits. Eliminating such funding or changing the policy would then require congressional action. Although the level of funding would be more stable, entitlements can be abandoned.

Figure 2.1 Organization of Stewardship Elements



- **Trust Fund**: Typical federal trust funds receive money from a tax or fee source, such as Social Security taxes, gasoline taxes, or severance taxes, and the money is dedicated to specific purposes, such as pensions, transportation needs, or strip-mine reclamation, respectively. The disbursement can be as an entitlement, as in Social Security, or can be subject to congressional appropriations. There is no obvious tax source for stewardship, but an initial set-aside of a fund drawing enough entitled income to support stewardship over the coming years is a possibility. A state or a non-profit stewardship corporation could hold the trust fund. Two ways for obtaining the principal are suggested:
  - **Lump sum**. Congress could authorize DOE to purchase a treasury security and/or a conservative equity issue on a one-time basis. The investment would have to generate sufficient income to fund stewardship and the impacts of inflation would have to be accounted for. For example, $200 million at 5 percent yields $10 million per year. The investment would be issued in the name of the principal steward (see Section 2.2.2) to ensure appropriate use of the interest income. In the event of a major stewardship failure requiring large unanticipated expenses, federal intervention would be required.
  - **Incremental accumulation**. An endowment fund could be set up with a nominal contribution, perhaps by a state. Then CERCLA Records of Decision for remediation actions would include estimates of annual stewardship costs, and would require deposit of a percentage of the remediation cost to the fund to cover future stewardship needs. Once a fund is established, its operation would be the same as if it originated from a lump sum, but incremental attainment of an adequate endowment might be politically easier than obtaining a lump sum.
- **The Present System**: The agency responsible for the contamination, DOE in this case, retains financial responsibility for funding the stewardship program. The present system has the advantage of continuity and legal responsibility for remediation.

2.2.2 Stewards

Stewards are individuals or groups responsible for stewardship activities and protection of human health and the environment. Many stewardship functions can be carried out by existing organizations. However, if no existing organization can perform a necessary function, a new organization must be developed. When more than one steward is involved, coordination is required to avoid unnecessary conflict and duplication of effort, but some redundancy of responsibilities is desirable. Stewards can be categorized as principal steward, implementation stewards, and oversight stewards.

- **The principal steward** has legal responsibility for contaminated land and facilities including the financial obligation to ensure adequate funding for stewardship, and to take corrective action if the stewardship program becomes ineffective.

- **Implementation stewards** are responsible for stewardship activities; examples of such activities are contracting for remediation, monitoring, maintenance, and record keeping.
- **Oversight stewards** ensure that the goals and requirements of a stewardship program are met.

Specific roles of stewards depend on the design of a stewardship program. Illustrative examples follow:

- **Federal government**. Because contamination at DOE facilities results from federal government activities and because the federal government is legally responsible for cleanup, the federal government is considered to be the principal steward. The federal government is also likely to be responsible for implementation of a stewardship program, including record keeping.
- **State government**. States are oversight stewards, and can be implementation stewards.
- **Local government**. Local entities such as planning commissions and registers of deeds are important implementation stewards, as are schools and libraries. Local governments also fulfill an oversight role.
- **Stakeholders**. Public stakeholders fulfill an oversight role by helping to ensure that stewardship programs and activities continue to be appropriate.
- **Local citizen oversight board**. A local citizen oversight board applies community values to the review of stewardship programs. A citizen board also acts as a guardian of stewardship information, and may serve as an ombudsman.[4]

2.2.3 Operations

For purposes of this report, stewardship operations include activities needed to ensure the integrity of remediation, to protect human health and the environment, and to provide information and public education. The relationship of operations to other elements of stewardship is shown in Figure 2.1.

The importance of maintenance and monitoring cannot be overemphasized. Proactive maintenance is necessary for longevity of physical structures such as caps, liners, water diversion trenches, sump pumps and other physical controls. Periodic monitoring provides advance indications as to whether contaminants are migrating beyond prescribed boundaries.

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[4] One who investigates citizens' complaints.

The success of stewardship is dependent upon the numerous activities that must be conducted in perpetuity to ensure that remediation retains its effectiveness and that stewardship systems are working. These operations of stewardship include at least the six elements briefly described below.

Monitoring: regular sampling of all contaminated and potentially contaminated media to identify the possible failure of physical controls and to provide continuous understanding of the nature and extent of contamination.

Maintenance: regular upkeep of remediation systems to ensure long-term effectiveness.

Surveillance: regular oversight of remediation and institutional systems to ensure that all necessary activities occur.

Enforcement: legal implementation of the constraints required to maintain the protection of human health and the environment.

Inspection and Reevaluation: periodic review of existing systems and activities to ensure their continued need and/or effectiveness.

Public Participation: continuous involvement of the public to ensure citizens' concerns are addressed and relevant public information is provided.

2.2.4 Physical Controls

Physical controls are barriers to limit public access to contaminants and exposure to hazards; their effectiveness depends on proper maintenance. Backup systems should be incorporated in the event that primary controls break down. Table 2.1 illustrates the relationship of physical controls to contaminated media and structures.

2.2.4.1 Barriers to Entry

Fencing, natural barriers (e.g., trees, surface water, or slope) and uncontaminated buffer zones isolate and limit access to contamination. Signs and markers warn people away from a site, and guards reinforce the effectiveness of barriers to entry.

Table 2.1 Relationship of Physical Controls to Contaminated Media and Structures

	Barriers to Entry					Control of Contaminated Waters			Operations and Maintenance
Contaminated Media and Structures	**Fencing**	**Signs & Markers**	**Natural Barriers**	**Buffer Zones**	**Guard**	**Alternative Water Supplies**	**Long-Term Pumping and Treatment**	**Erosion/ Sediment Control**	
Groundwater	—	Yes	—	Yes	—	Yes	Possible	—	Yes
Surface Water	Possible	Yes	Possible	Possible	Possible	Yes	Possible	Yes	Yes
Contaminated Soils	Yes	Yes	Possible	Yes	Yes	Yes	—	Yes	Yes
Buried Waste	Yes	Yes	Possible	Yes	Yes	—	—	Yes	Yes
Engineered Disposal Facilities	Yes	Yes	Possible	Yes	Yes	—	—	Yes	Yes
Contaminated Facilities In Use	Yes	Yes	—	Yes	Yes	Yes	—	Yes	Yes
Abandoned Structures	Yes	Yes	—	Yes	Yes	—	—	Yes	Yes

2.2.4.2 Engineered Barriers to Exposure

Exposure to contaminated groundwater or surface water and sediments is limited by providing alternate water supplies, pumping and treating groundwater, and controlling erosion.

2.2.5 Institutional Controls

Institutional controls are legally binding provisions (such as local ordinances and state and federal laws) designed to control future uses of land or resources by limiting development and/or restricting public access to a site with residual contamination. Sufficient oversight should be in place to ensure that institutional controls are being enforced. There should be a measure of overlap amongst institutional systems in order to maintain a safe margin of redundancy. Advisories and warnings, although not legally enforceable, are considered institutional controls. Institutional controls can be divided into governmental controls and proprietary controls. Table 2.2 illustrates the relationship of institutional controls to contaminated media and structures.

2.2.5.1 Governmental Controls

Governmental controls use the power vested in a national, state, or local government to impose restrictions on citizens or areas under its jurisdiction. Local governmental controls enforced through permitting and inspection processes include zoning ordinances, which can regulate activities such as business development in specific areas, the size of land parcels, the types and sizes of structures, and activities permitted on the land.

2.2.5.2 Proprietary Controls

Proprietary controls allow property owners to control the use of or limit access to their properties. Proprietary controls include:

- **Advisories**, which are warnings to the public and are not legally enforceable (e.g. fish from a waterway should not be consumed.) (See Appendix C for a case study that highlights the problems associated with signage.)
- **Government ownership**, which ensures that property and its control remain within the hands of the government.
- **Easements**, which control legal access to privately owned land. Easements can allow for environmental remediation or sampling activities.
- **Reversions**, which cause ownership to revert to the previous owner should land use differ from that stipulated in a deed.

Table 2.2 Relationship of Institutional Controls to Contaminated Media and Structures

	Governmental Controls on the Use of Private Property			Proprietary Controls					
Contaminated Media and Structures	**Ordinances**	**Zoning**	**Building Permits**	**Advisories to the Public**	**Government Ownership**	**Deeds**	**Easements**	**Reversions**	**Site Registries**
Groundwater	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Surface Water	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Contaminated Soils	Yes	Yes	Yes	Yes	Yes	Yes	--	Yes	Yes
Buried Waste	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Engineered Disposal Facilities	Yes	Yes	Yes	--	Yes	Yes	--	Yes	Yes
Contaminated Facilities In Use	Yes	Yes	--	--	Yes	Yes	--	Yes	Yes
Abandoned Structures	Yes	Yes	--	Yes	Yes	Yes	--	Yes	Yes

- **Deed notices or restrictions**[5], which warn future property owners about the extent of remediation and any residual contamination that may remain on a property. Deed restrictions also can limit the use of a property and are enforceable through civil courts. Both notices and restrictions are recorded with a property deed and remain with the deed through successive owners.
- **Site registries**, which identify and describe hazardous waste sites within a specific tract of land. These registries can be kept at local, state, or federal levels and are reviewed during land transfer.

2.2.6 Stewardship Information

Stewardship information provides present and future stakeholders with records of locations, amounts, and characteristics of residual contamination. Accurate, durable, and complete information regarding contamination risks and stewardship requirements must be available for a stewardship program. This information must be kept current through research. Data from surveillance and monitoring activities must be readily available to stewards and stakeholders.

2.2.6.1 Development

The information essential for a working stewardship program must be accurate, clear, concise, and of appropriate scope and detail. For example, a CERCLA Remedial Investigation/Feasibility Study contains vast amounts of information that must be condensed to be useful for stewardship activities. Other CERCLA documents prepared during and after remediation (see Section 3) also contain important stewardship information (e.g., Remedial Action Work Plan and the 5-Year Review Report.)

2.2.6.2 Information Maintenance

Stewardship information must be kept up to date and be retrievable for the lifetime of a stewardship program. However, over time, the scope and detail of information must be reevaluated. Since stewardship may be necessary for thousands of years, stewardship information must be maintained with carefully chosen storage technology.

One implementation steward should have the responsibility to maintain an archive and to provide detailed stewardship information. However, as a safeguard against loss, some information should be stored in multiple forms and

[5] English, M. *et al.* 1997. Institutional Controls at Superfund Sites: A Preliminary Assessment of their Efficacy and Public Acceptability. p 24. Deed restrictions are less effective than it appears to the layperson, particularly if enforcement depends on common law.

by multiple stewards. The CERCLA Records of Decision should identify the types of information and requirements for maintaining that information.

The local government responsible for property records can maintain maps of land use and resources and records of contaminated land tracts. These records should include summaries of major contaminants and their locations. Statutes could mandate that records of past contamination must be made available to a prospective owner or lessee.

Data are meaningless to the user if they are not organized in an understandable and relevant format. A coordinated link should be established between collectors, interpreters, and users of data.

2.2.6.3 Accessibility

Basic stewardship-related information should always be accessible to the public. Multiple institutions facilitate accessibility when data are consistent. For example, a stakeholder could access contamination information at a public document room, a neighborhood library, a local oversight board's archives, or an Internet web site. In addition to basic stewardship information, a wider range of technical information also should be made available for interested stakeholders.

2.2.7 Research

When remediation activities are completed, significant data gaps and uncertainties will remain about existing and long-term hazards. Present-day regulations are based on current understanding of the hazards posed by exposure to contaminants. Over time, new data may provide better assessments of contamination, risks, appropriate remedial technologies, management of wastes, information for decision making, and stewardship requirements. A national research program aimed at these objectives should be maintained.

Locally it is important to evaluate how a site changes over time. Natural, biological, and physical processes (e.g., radioactive decay) may impact the nature and movement of residual contamination. Regular sampling of flora, fauna, biological systems, groundwater, surface water, air, and soil can establish whether the nature of contamination has changed or if contamination is moving away from source areas. New data from national research programs and local monitoring of environmental conditions must be applied to stewardship requirements and integrated with existing data in a stewardship information system. (See Appendix C for a case study that illustrates how new data may affect stewardship requirements.)

The detailed development of a stewardship research program is beyond the scope of this report. However, the following factors must be considered:

- It must support the stewardship program and must yield insight into the problems of the long-term storage of radioactive and chemically hazardous wastes.
- It must fill data gaps, reinforce the surveillance program, and contribute to predictions of the performance of existing or future remediation technology.
- It must address the questions of physical control of waste and the risk factors of waste in the human and the natural environment.
- It should use the DOE reservations to advance environmental science and the knowledge of ecosystems.
- Environmental engineers and environmental scientists should help design a stewardship research program.
- Within the above objectives, research also should apply to more general problems of waste disposal.

3.0 STEWARDSHIP AND THE CERCLA PROCESS

3.1 THE CERCLA PROCESS

The principal federal law governing hazardous waste cleanup is the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). Under CERCLA, the U. S. Environmental Protection Agency (EPA) evaluates federal facilities for inclusion on the National Priorities List, based on the level of contamination, affected receptors (i.e., human population, ecosystems) and pathways through which contamination might reach receptors. Placement on the National Priorities List increases public awareness of contamination, involves the EPA in cleanup oversight, and aids in allocation of cleanup funds.

The Oak Ridge Reservation was placed on the National Priorities List on November 21, 1989. However, large areas of the Reservation have never been used for nuclear weapons production, research processes, or waste management. These unaffected areas of the Reservation are proposed for delisting and removal from the provisions of CERCLA. Following delisting, up to 6,000 acres of the 35,000-acre Reservation would be subject to CERCLA.

The EPA headquarters coordinates and sets policy for environmental restoration of federal facilities. The DOE is responsible for determining the nature and extent of contamination, ensuring that remediation takes place, and for funding the work at DOE facilities, including the Oak Ridge Reservation.

At National Priorities List facilities, regulatory agencies oversee remediation. For the Oak Ridge Reservation, regulatory authority and oversight are vested in EPA Region 4 and the Tennessee Department of Environment and Conservation (TDEC). Local government and the public play less formal roles by commenting on CERCLA documents or taking political action.

The CERCLA requires a legally binding Federal Facility Agreement between agencies (i.e., DOE, EPA and TDEC) to establish timetables, procedures and documentation for cleanup of federal facilities on the National Priorities List. The Federal Facility Agreement governs site characterization, interim cleanup actions, and long-term cleanup activities. After two years of work by DOE, EPA and TDEC, the Federal Facility Agreement for the Oak Ridge Reservation was implemented on January 1, 1992.

3.2 CERCLA DOCUMENTATION

Under the CERCLA process, a Record of Decision formally documents the selection of a preferred cleanup method. Preceding the Record of Decision, a Remedial Investigation/Feasibility Study determines the nature and extent of contamination and evaluates feasible remediation alternatives, one of which is designated as the

preferred alternative. These alternatives, including the preferred alternative, are summarized and presented to the public for review and comment in a Proposed Plan. After receiving concurrence on the Proposed Plan from EPA, TDEC and the public, the selected alternative is published in a Record of Decision. The Record of Decision is a key milestone in the CERCLA process because it:

- Documents a legally binding decision that cannot be changed without following specific procedures, including public review;
- Provides the technical basis for the cleanup decision; and
- Summarizes public comments and DOE's responses.

Following the Record of Decision, DOE prepares a Remedial Design Work Plan and a Remedial Action Work Plan for implementation of cleanup activities. After construction is finished a Remedial Action Report is issued. This report summarizes the conduct and results of field construction and monitoring activities and documents that the remedial actions were performed in compliance with CERCLA. Timetables and deadlines established by DOE, EPA and TDEC for cleanup efforts are found in Appendix E of the Federal Facility Agreement.

As many as 15 documents may be prepared for a single remedial action. Under CERCLA, only the Proposed Plan is advertised and subject to public review and comment. However, at the request of the public, the DOE-Oak Ridge Operations Environmental Management Program regularly provides other pre- and post-decision documents for public review at the Information Resource Center (105 Broadway Avenue, Oak Ridge, Tennessee 37830, phone 423-241-4582). These documents constitute part of the Administrative Record for each remediation decision on the Oak Ridge Reservation.

3.3 THE HISTORY OF STEWARDSHIP AND CERCLA

Stewardship is synonymous with institutional controls in the minds of many environmental remediation managers and regulators, because early criteria for radioactive wastes emphasized isolation of sites and control by engineered and natural barriers (EPA 1978).[6] Only recently has land use become a factor in the remedy selection process, and with it comes a suite of stewardship considerations as described in this report and as proposed in the 1997 amendments to CERCLA (see Section 3.3.1 below).

[6] U.S. Environmental Protection Agency. 1978. Criteria for Radioactive Wastes. *Federal Register*, Vol. 43, no. 221, pp 53262-53268.

Presently, no clear statutory provisions exist for the use of institutional controls as an alternative remedial action. Lack of such provisions is based on EPA's preference for "permanent" cleanups as described in CERCLA and the Superfund Amendments and Reauthorization Act (SARA) of 1986. Section 120 (h) of CERCLA does require documentation of the condition of federal lands upon sale or transfer, and it establishes that the federal government is responsible for any remedial action found to be necessary after the transfer of land.

However, institutional controls are not a new feature of the Superfund program; they have been used at National Priorities List sites since the program's inception. Historically, they were used at sites when it was not cost-effective or technically feasible to reduce the volume of contamination to levels that provided adequate protection for unrestricted use. In 1985, only 14% of all Records of Decision anticipated the use of institutional controls as part of the remedy; by 1991, institutional controls were anticipated in 55% of all Records of Decision. Deed or land use restrictions accounted for most of the institutional controls planned or in use, followed by restrictions on groundwater use, well installation, site access and soil excavation.[7]

Applying institutional controls/stewardship to the remediation of contaminated sites has been slow to develop, and promulgation of new regulations is equally slow. In 1992[8], EPA issued guidance on the use of institutional controls at CERCLA sites. In 1995[9], EPA issued a memorandum stating that, if EPA develops remediation alternatives that include institutional controls, it should determine: the type of institutional control to be used; the authority to implement the institutional control; and the appropriate entity's resolve and ability to implement the institutional control.

3.3.1 Proposed Amendments to CERCLA

In 1997, a bill was introduced in the House of Representatives to amend CERCLA and to reauthorize and reform the Superfund program (H.R. 2727, October 23, 1997, by Rep. Sherwood Boehlert, R-NY). In Title I, Section 102 (Remedy Selection), institutional controls are proposed as a remedial action for cases where ". . . hazardous substances remain onsite at a facility. . . " For such cases, restrictions on

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[7] Resources for the Future. 1997. Linking Land Use and Superfund Cleanups: Uncharted Territory, p. 70.

[8] U.S. Environmental Protection Agency. 1992. Use of Institutional Controls at Superfund Sites. Memorandum from D. F. Coursen to H. F. Corcoran. Washington, D.C.

[9] U. S. Environmental Protection Agency. 1995. Land Use in the CERCLA Remedy Selection Process. OSWER Directive No. 9355.7-04. Washington, D.C.

use, implementation of institutional controls, and monitoring and enforcement are described. The amendment states that restrictions and institutional controls must be clearly specified in Records of Decision and public notices, and must be incorporated in public land records.

In addition, a registry of restrictions is proposed that will include any subsequent changes in the nature or form of such controls. Furthermore, an annual report would be required for every Record of Decision to include types of institutional controls and media affected and the institution designated to monitor, enforce and ensure compliance with institutional controls. Section 102 of H.R. 2727 also includes a list of balancing factors for determining the appropriate remedial action, among which is the affected community's acceptance of a remedy.

In Section 103 of H.R. 2727, the existing site review requirement is amended to include review of the effectiveness of and compliance with any institutional controls related to the remedial action. Proposed amendments also provide for public involvement in and notification of institutional controls. In Section 104, with regard to land use, proposed amendments state that "substantial weight" must be given to any consensus recommendations established by a site specific advisory board. Section 111 amends the definition of "remedy" to include "obtaining, ensuring adequate public notice of, and otherwise tracking and maintaining the protections afforded by institutional controls, including easements acquired under Section 104 (K)."

Thus, CERCLA may soon be amended to result in statutory provisions for the use and monitoring of institutional controls. Such monitoring will be in addition to the post-closure monitoring required under the Resource Conservation and Recovery Act (a maximum of 30 years) and the post-Record of Decision compliance monitoring currently required under CERCLA (5-year reviews). In the meantime, the public can insist that stewardship and institutional control requirements for which DOE is responsible are included in Records of Decision and other remedial action documents for any DOE facility.

3.4 INCORPORATING STEWARDSHIP INTO CERCLA

Stewardship planning must be an integral part of the CERCLA process whenever radioactive or chemically hazardous materials remain on the Oak Ridge Reservation or any DOE facility after remediation. Long-term stewardship issues and requirements should be addressed at each phase of the process to ensure effective integration of stewardship into decision making.

Although statutory requirements for stewardship are currently lacking, stakeholders can insist that CERCLA documents have stewardship sections that describe site-specific requirements for implementation of a stewardship program. In particular, stewardship requirements should be included in the Feasibility Study, the Proposed

Plan, the Record of Decision, the Remedial Design Work Plan, the Remedial Action Work Plan, and the Remedial Action Report.

Various stewardship options will likely be proposed for a site depending on the remedial actions under consideration. The chosen option should be able to be integrated into an overall stewardship program. The DOE, in concert with the regulators and the public, should develop a stewardship plan that identifies specific design requirements for implementation of such a stewardship program, and these design requirements should be an integral part of a revised Federal Facility Agreement.

In the Comparative Analysis section of a Feasibility Study, CERCLA criteria are compared for all remedial alternatives. The concept of stewardship can be incorporated in the Feasibility Study by requiring that stewardship criteria (including costs) for the site be developed and included in the CERCLA criterion for long-term effectiveness.

Any stewardship issues raised in the Feasibility Study can be addressed during preparation of the Proposed Plan. In the Proposed Plan, a strategic approach for long-term stewardship can be presented.

The Record of Decision should include the stewardship plan for the chosen alternative and require its application. The Record of Decision provides a legal basis for enforcement of the stewardship plan and is the baseline for post-Record of Decision implementation documents. Details for the stewardship plan would be described in the post-Record of Decision documents such as the Remedial Design Work Plan, Remedial Action Work Plan, and the Remedial Action Report.

On April 21, 1998, a new EPA Region 4 policy[10] was issued that will help to institutionalize stewardship provisions at federal facilities in the southeast United States. The new policy, entitled Assuring Land Use Controls at Federal Facilities, contains some of the stewardship provisions found in this report. It requires that a Land Use Control Assurance Plan be prepared to ensure the effectiveness and reliability of land use controls. Land use controls are any restriction or control that limits use of and/or exposure to real property on federal facilities, including water resources. (Land use controls include the physical and institutional controls listed in Sections 2.2.4 and 2.2.5 of this report.) The Land Use Control Assurance Plan is a facility-wide plan that requires:

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[10] U.S. Environmental Protection Agency Region 4. 1998. Assuring Land Use Controls at Federal Facilities. Memorandum from J. D. Johnston, Chief, Federal Facilities Branch to Federal Facilities Branch.

1. Development and approval of site-specific Land Use Control Implementation Plans (normally written after a Record of Decision requires one or more land use controls);
2. Identification of the program and point-of-contact responsible for monitoring, maintaining and enforcing Land Use Control Implementation Plans;
3. Provisions for funding land use controls in budget allocation requests;
4. Quarterly on-site monitoring for compliance with Land Use Control Implementation Plans; and
5. 60-day notifications to EPA and State regulators before "major changes in land use."

The Land Use Control Assurance Plan should be an integral part of the overall Oak Ridge Reservation program and incorporated into the Federal Facility Agreement.

4.0 STEWARDSHIP AND END USE OF THE OAK RIDGE RESERVATION

During development of end use recommendations for contaminated areas on the Oak Ridge Reservation, it became increasingly apparent to the EUWG that some level of contamination will remain on the Reservation and that a stewardship program is needed to protect the public and the environment from future risks associated with residual contamination.

4.1 THE ENVIRONMENTAL PROBLEM

The 35,000-acre Oak Ridge Reservation includes three major DOE installations: the East Tennessee Technology Park (formerly the K-25 Site), Oak Ridge National Laboratory in Bethel Valley, and the Y-12 Plant. These installations occupy about 30 percent of the Reservation; the remainder of the land is designated as a National Environmental Research Park. The Research Park was established in 1980 to provide protected land for environmental science research and education and to demonstrate that energy technology development can coexist with a quality environment. It also serves as a buffer zone between the major installations. All of the Reservation lies within Anderson and Roane Counties, and the vast majority of the property is within the city limits of Oak Ridge. The Clinch River forms the southern and western boundaries of the Reservation.

Since the early 1940s, the Oak Ridge Reservation has been the site of vital national security missions. These activities left a legacy of radioactive and toxic chemical wastes, requiring management and/or disposal. Between 5 and 10 percent of the Reservation is occupied by old waste disposal sites, most of which lack engineered containment structures. Radioactive and toxic chemical pollutants present in mixed-waste burial grounds, settlement ponds, seepage pits and trenches, inactive tanks, abandoned underground pipelines, and surplus facilities have contaminated soil, groundwater, and surface water in their vicinity. The radioactivity is dominated by tritium (with a half-life of approximately 12 years) and strontium and cesium (with half-lives of approximately 30 years). Hazards from these three radionuclides will markedly diminish in about 300 years. There are also quantities of radioactive uranium (which will pose a hazard for millions of years). Some PCBs and other toxic chemicals also contain small amounts of radioactivity.

Abundant rainfall (annual average of 55 inches) and high water tables (e.g., 0 to 20 feet below the surface) contribute to leaching of contaminants from the waste areas. The leaching results in contaminated soil, surface water, sediments, and groundwater. The underlying geology is complex, and migration of contaminants in groundwater is difficult to monitor on many parts of the Reservation.

In order to consolidate investigation and remediation of contaminated areas, the Reservation has been divided into five large tracts of land roughly equivalent to the major hydrologic watersheds. The DOE, with the knowledge of the public and the

concurrence of EPA Region 4 and TDEC, decided that a comprehensive watershed approach to planning remediation activities is more effective than the usual unit-by-unit approach. One or several CERCLA Records of Decision for each watershed will be produced, instead of hundreds of decision documents, potentially resulting in considerable savings in time and money. In addition, the watershed approach provides the public with a roadmap of proposed remediation actions, facilitates public oversight of DOE's progress, and allows comprehensive stewardship planning for the Reservation. The extent of the five watersheds is illustrated in Figure 4.1

Table 4.1 provides a summary of the major contaminants known to be present and likely to remain at some concentration within the five watersheds on the Oak Ridge Reservation.

Figure 4.1 Administrative Watersheds on the Oak Ridge Reservation

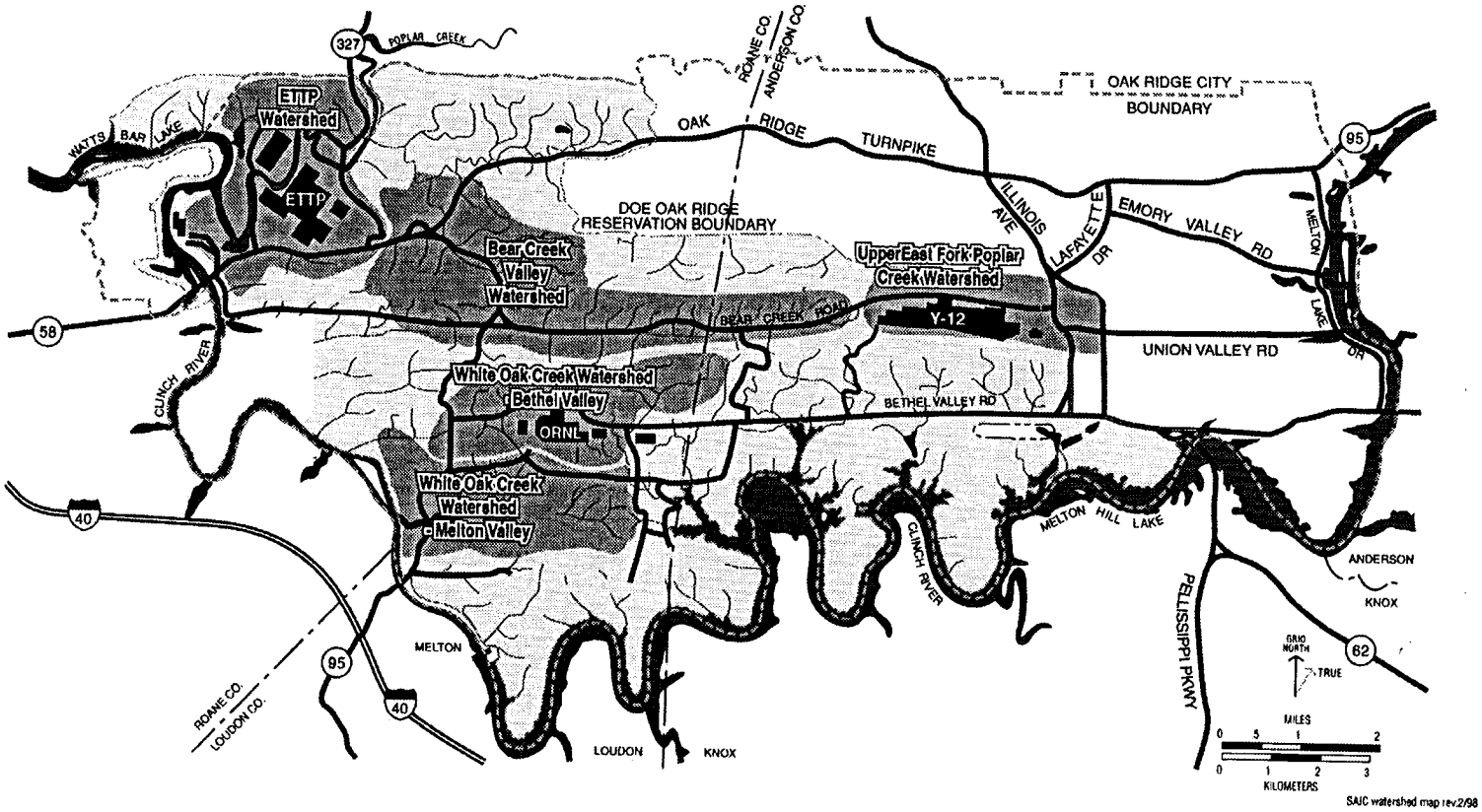


Table 4.1 Some Major Known Contaminants on the Oak Ridge Reservation

CATEGORY	BEAR CREEK VALLEY	BETHEL VALLEY	EAST TENN TECHNOLOGY PARK	MELTON VALLEY	UPPER EAST FORK POPLAR CREEK
Contaminated Groundwater	uranium-235, uranium-238, nitrates	strontium-90, uranium, VOCs	TCE, PCE, TCA	strontium-90, tritium, VOCs	VOCs, nitrates, uranium-238, technetium-99
Contaminated Surface Water and Sediments	uranium, cadmium, nitrates	strontium-90, mercury, cesium-137	uranium-238, nickel, PCBs	tritium, strontium, cesium-137	metals, PCBs, radium & SVOCs in sediment
Contaminated Soils	uranium-235, uranium-238	cesium-137, mercury	uranium-238, nickel, PCE	cesium-137, PCBs, mercury, cobalt-60	mercury, uranium-238, radium-226, cesium-137 (low levels), PCBs, technetium-99
Buried Waste	uranium-235, uranium-238	strontium-90, cesium-137, cobalt-60, metals	uranium-238, PCE, TCE	strontium-90, tritium, transuranics, mixed waste	uranium-238, metals, VOCs, SVOCs, nitrates
Engineered Disposal Facilities	uranium-235, uranium-238	none	none	low-level waste, strontium, tritium	non-hazardous solid waste landfills on Chestnut Ridge
Containers in Storage	VOCs, PCBs	uranium-233	low-level waste, uranium hexafluoride	transuranic waste	uranium oxide, uranium-235 in storage, uranium hexafluoride
Contamination in Structures in Use	none	strontium-90, cesium-137	uranium-238	transuranic and low-level waste	mercury, uranium, isolated beryllium
Contamination in Abandoned Structures	none	strontium-90, cesium-137	uranium-235, uranium-238, technetium-99	low-level waste	mercury, uranium

VOC= Volatile Organic Compound

SVOC= Semi-Volatile Organic Compound

TCE= Tricholorethene

PCE=Tetrachloroethene

TCA=Trichloroethane

PCB=Polychlorinated Biphenyl

4.2 END USES OF THE OAK RIDGE RESERVATION

The End Use Working Group (EUWG) developed a hierarchy of possible end use categories for contaminated areas on the Oak Ridge Reservation. The five categories and their criteria are shown in Table 4.2. The criteria were used to differentiate among possible end uses. They do not represent regulatory or remediation requirements, but were developed to assist the EUWG in comparing alternative end use scenarios. The EUWG's recommendations based on these criteria and the EUWG's Community Guidelines were provided to DOE and regulators to aid in decision making for remediation activities. Actual remediation is based on more detailed information, analysis, and design than these simple end use criteria used by the EUWG. (See Appendices D and E for copies of the EUWG recommendations and Community Guidelines.)

Table 4.2 End Use Working Group Criteria for Comparing Alternative End Use Scenarios

	END USE CRITERIA				
END USE CATEGORY	SURFACE USE	DEPTH OF CLEAN SOIL	GROUND-WATER USE	SURFACE WATER USE	OWNERSHIP
Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Government or Private
Uncontrolled Industrial	Industrial	10 feet	Not Allowed	Unrestricted	Government or Private
Recreational	Recreational	2 feet	Not Allowed	Recreational Uses	Government or Private
Controlled Industrial	Industrial with Restrictions	2 feet	Not Allowed	Not Allowed	Government or Private
Restricted Waste Disposal	Limited to Monitoring & Maintenance	No Soil Disturbance Allowed	Not Allowed	Not Allowed	Government

As shown in Table 4.2, the criteria for uncontrolled industrial use are more stringent than the criteria for restricted waste disposal use. For comparing end uses for a contaminated site, soil would be excavated to 10 feet to allow for uncontrolled industrial use and no soil would be excavated for restricted waste disposal use. Short-term risks and costs associated with restricted waste disposal would be considerably less than those associated with controlled industrial end use. However, a restricted waste disposal site would have long-term costs for stewardship and institutional controls to protect human health and the environment. It is important that such trade-offs are evaluated during the CERCLA Feasibility Study process and factored into CERCLA Proposed Plans and Records of Decision.

The EUWG developed end use recommendations for all five administrative watersheds on the Oak Ridge Reservation. As shown in Table 4.3, some contamination and associated end use restrictions are likely to remain following remediation of the five watersheds. The EUWG is not making recommendations for final cleanup levels or remediation technologies. However, the Group recognizes that removal of the millions of cubic yards of waste to a drier, more isolated site is unlikely due to risk, cost, politics, and equity.

Stewardship plans must be developed concurrently with remediation plans. Oak Ridge stakeholders cannot endorse any remediation program for the Reservation that results in residual contamination above health-based levels without the assurance that all necessary and appropriate actions for stewardship will be implemented to ensure that human exposure to contamination does not occur following remedation.

Table 4.3 End Use Working Group End Use Recommendations for Contaminated Areas on the Oak Ridge Reservation

END USE CATEGORY	BEAR CREEK VALLEY	BETHEL VALLEY	EAST TENNESSEE TECHNOLOGY PARK	MELTON VALLEY	UPPER EAST FORK POPLAR CREEK
Unrestricted	Zone I (western area) Zone II (buffer zone)-long-term	—	—	—	—
Uncontrolled Industrial	—	—	Zone I (western, former power plant) Zone II (former production area)	—	Eastern area of Y-12 Plant
Recreational	Zone II (buffer zone)-interim use (w/ DOE control)	—	Zone I (western, former power plant)	—	—
Controlled Industrial	—	All of ORNL; surface use only for contaminated lands	Zone III (eastern area, former support facilities)	In areas of valley deemed usable	Western area of Y-12 Plant; Lake Reality, New Hope Pond
Restricted Waste Disposal	Zone III (eastern area)	—	Potentially K-1070 B and C/D disposal areas	All disposal areas	Chestnut Ridge

5.0 STEWARDSHIP FOR THE OAK RIDGE RESERVATION

With this report, the Stewardship Committee is calling on DOE to plan for and implement a stewardship program for contaminated land on the Oak Ridge Reservation. Planning for stewardship must proceed concurrently with planning for remediation so that stewardship requirements are included as an integral part of all CERCLA decision documents. The plans, developed with stakeholder input, should be in place by the end of 1999. For initiation of the program, stewards must be designated and stewardship activities assigned. We also know that institutions and committees come and go, and local governments can last a long time, so we anticipate meaningful involvement of the City of Oak Ridge and Anderson and Roane counties in the development, implementation, and oversight of stewardship activities. The Stewardship Committee recognizes there is more than one approach to achieving the desired results.

The recommendations in this section are based on the key elements of stewardship outlined in Section 2 and the principles listed below. The recommendations are intended as a starting point for a comprehensive, integrated stewardship program for the Oak Ridge Reservation. The principles are:

1. Use of existing systems and organizations to the maximum extent possible;
2. Development of stewardship plans during remedial decision-making;
3. Application of the three attributes of stewardship—responsibility, long-term effectiveness, adaptability; and
4. Involvement of stakeholders in planning for and implementation of stewardship.

5.1 STEWARDS FOR THE OAK RIDGE RESERVATION

Section 2 identifies the types and roles of stewards necessary for an effective stewardship program (i.e., principal, implementation and oversight stewards). These stewards must be designated while remediation is in the planning stages so that stewardship responsibilities and activities are included in each Record of Decision. Potential stewards and their responsibilities are described below.

5.1.1 Principal Steward

As required by CERCLA, the federal government (currently DOE) is the principal steward and is fiscally and legally responsible for remediation and stewardship. However, it is important to recognize that implementation stewards will do the actual work.

5.1.2 Implementation Stewards

Implementation stewards will be responsible for operations, including maintenance, monitoring, and information activities for the Oak Ridge Reservation stewardship plan. Many groups from all levels of government will have some role in the implementation of stewardship. Clearly establishing the relationship among

implementation stewards and between the principal steward and the implementation stewards will be critical to the success of the stewardship program.

Potential implementation stewards and their responsibilities are shown in Table 5.1. These are currently functioning organizations and require only the addition of specific new stewardship duties as indicated.

5.1.3 Oversight Stewards

Oversight stewards ensure that stewardship plans meet their intended purposes, that remediation performs as intended, and that the best interests of the public are met. Table 5.2 shows existing organizations expected to have an oversight role following remediation on the Oak Ridge Reservation.

5.1.4 Coordination and Oversight of Stewards

The Stewardship Committee focused on identifying existing organizations that could be responsible for supporting functions and activities necessary for effective stewardship. It was soon clear that the diverse nature of stewardship would require coordination and oversight of stewards and stewardship activities. Thus, this section of the report recommends that three new committees be convened, to be dedicated to coordination (Section 5.1.4.1), oversight (Section 5.1.4.2) and transition (Section 5.1.4.3) Although suggestions on the composition of these groups are presented below, details of the formation and appointments to stewardship committees, and their structure and function, are not within the scope of this document.

5.1.4.1 Stewardship Coordinating Committee

Each of the existing oversight organizations will continue to have an important role in ensuring the long-term protection of human health and the environment of the Oak Ridge community. However, coordination of stewardship activities will be the primary responsibility of a newly-formed Stewardship Coordinating Committee. The Committee, composed of representatives of the principal, implementation, and oversight stewardship groups, and the public, will meet periodically to ensure that all stewards for the Oak Ridge Reservation are cooperating effectively.

Table 5.1 Potential Implementation Stewards for the Oak Ridge Reservation

Category	Organization	Functions
Federal Government (DOE)	Various contractor(s) to DOE (or the federal government)	Monitoring, maintenance, security, signage, surveillance
	Document Management Center	Working report repository
	Information Resource Center	Public access to CERCLA and other remediation documents
	Office of Scientific and Technical Information	Report literature, indexing and abstracting
	American Museum of Science and Energy	Permanent stewardship exhibits, public outreach
Federal Government (not DOE)	Tennessee Valley Authority, US Army Corps of Engineers	River environmental quality, river navigation, flood plains and wetlands, dredging
	National Oceanographic and Atmospheric Administration	Atmospheric monitoring
	National Technical Information Service	Long-term archiving
State Government	Office of Information Resources	State Parcel Maps and public access to the Geographic Information System (GIS)
Local Government	Register of Deeds (Anderson and Roane Counties)	Preservation of deeds, easements, parcel maps (e.g., plat, block, subdivision)
	Oak Ridge Regional Planning Commission, Community Development Office	Parcel maps, zoning and use approvals, building permits, and enforcement
	County Property Assessors Office; Oak Ridge Finance Department-Tax Office	Annotated tax records (to include contamination data)
	Public Schools	Education
	Public Library	Public awareness
Board of Realtors	Local realtors	Notices to Buyers (required by State law), addition of contamination to the notice list

Table 5.2 Existing Oversight Stewards for the Oak Ridge Reservation

Category	Organization	Functions
Federal Government	Department of Energy	Compliance with DOE Orders
	Environmental Protection Agency	Compliance with federal regulations
	Occupational Safety and Health Administration	Workplace safety
	National Institutes for Occupational Safety and Health	Worker exposure
	Nuclear Regulatory Commission[1]	Radiation safety
	Centers for Disease Control and Agency for Toxic Substances and Diseases Registry	Public exposure and safety
	Tennessee Valley Authority	River environmental quality
State Government	Tennessee Department of Environment and Conservation	Compliance with State regulations, advisories for contaminated fish/waters
	Tennessee Wildlife Resources Agency	Use of wildlife resources; aquatic contamination information
	Tennessee Department of Health	Public health
County Government	Roane County Environmental Review Board	Roane County oversight
City of Oak Ridge	Environmental Quality Advisory Board	Environmental quality oversight
Other	Local Oversight Committee and its Citizens' Advisory Panel	Local government oversight
	Environmental Management Site Specific Advisory Board	Citizen input to DOE activities on the Oak Ridge Reservation

[1] Projected

The point-of-contact required by EPA Region 4 for monitoring, maintaining, and enforcing the Land Use Control Implementation Plan(s) for the Oak Ridge Reservation (see Section 3.4) also will sit on the Coordinating Committee. The Committee will review new information and technologies, evaluate changing contamination and environmental conditions on the Reservation, and recommend revisions to the stewardship plan. The Committee also may contribute to public awareness through a newsletter and periodic or ad hoc meetings when appropriate. The DOE should provide financial and administrative support for the Stewardship Coordinating Committee. Should the federal government cease to function as the principal steward and fail to designate a credible replacement, then responsibility for coordination of stewardship will fall to the local governments.

5.1.4.2 Citizens' Oversight Board - the Public Role in Stewardship

The DOE has found that public participation enhances credibility and contributes to understanding of and progress for environmental remediation on the Oak Ridge Reservation. Thus, a Citizens' Oversight Board for Stewardship will provide an effective interface between the public and the stewardship program. The Board will review stewardship activities and documents; provide advice and recommendations to DOE, EPA and TDEC based on citizen input; and participate in the preparation of an annual report describing the progress of the stewardship program, its shortcomings, and milestones for the coming year. The annual report will be a roadmap for citizens and citizen organizations to judge the effectiveness and adequacy of the DOE stewardship program for the Oak Ridge Reservation. The function of a Citizens' Oversight Board might be assigned to an existing citizens' group (e.g., the Site Specific Advisory Board and/or the Local Oversight Committee's Citizens' Advisory Panel), interacting with other local citizen organizations to disseminate stewardship information and to solicit broad-based citizen input to the stewardship program. It may also function as an ombudsman for the public.

5.1.4.3 Stewardship Transition Team

Prior to establishment of the more formal Citizens' Oversight Board, DOE should initiate a Stewardship Transition Team in the fall of 1998. The transition group will be short-lived. Its mission will be to assist in the development and implementation of the stewardship program for the Oak Ridge Reservation, including the public oversight function.

5.2 PHYSICAL CONTROLS ON THE OAK RIDGE RESERVATION

Many physical controls, designed to limit access to contaminated areas, are in place on the Oak Ridge Reservation. Thus, near-term actions are directed toward surveillance, maintenance, and enforcement of existing barriers to entry. Physical control of migrating contaminants depends on source reduction, monitoring, and barriers to limit contaminant spread. These physical controls over the long term are costly to maintain but are necessary when end use recommendations result in less than complete cleanup of contaminated areas. Table 5.3 provides an overview of physical controls likely to be required for end uses of contaminated property on the Oak Ridge Reservation. Details of physical controls are part of remedial decision making, and each Record of Decision must specify the required controls consistent with end use of the area, level of remediation, and residual contamination.

Table 5.3 Possible Physical Controls for End Uses of Contaminated Areas on the Oak Ridge Reservation

	Barriers to Entry					Control of Contaminated Waters			
End Use Category	Fencing	Signs & Markers	Natural Barriers	Buffer Zones	Guards	Alternative Water Supplies	Long-Term Pumping and Treatment	Erosion/ Sediment Control	Operation and Maintenance
Unrestricted	Not required	Information signs helpful	Not required	Not needed	Not required	Not applicable, groundwater use is unrestricted	Not applicable, all waters unrestricted	Not needed	Infrequent monitoring of land and environmental conditions
Uncontrolled Industrial	Not required but optional	Information signs required	Not required	Not required	Not required but optional	Yes, since groundwater use is restricted	Probably not required	Depends on environmental conditions	Periodic monitoring of property
Recreational	Not required but optional	Information signs required	Not manda-tory but suggested	Not required but helpful	Sporadic patrols	Yes, since groundwater use is restricted	Depends on the environmental conditions	Probably needed to offset recreational wear and tear	Periodic upkeep of signs and other structures
Controlled Industrial	Strongly advised	Warning signs required	Strongly advised	Strongly advised	Regular patrols	Yes, since groundwater use is restricted	Depends on nature/extent of residual contamination	May be needed depending upon industrial usage	Regular inspection of physical controls for signs of degradation
Restricted Waste Disposal	Mandatory around all waste disposal cells	Warning signs mandatory	Very strongly advised	Required if viable	Frequent patrols	Not applicable, since no activity will be allowed at a waste disposal site	Only to control migration from site	No sediment disturbance allowed at a waste disposal facility site	Frequent maintenance of disposal cell and other remediation structures

5.3 INSTITUTIONAL CONTROLS ON THE OAK RIDGE RESERVATION

In contrast to physical controls, many of which are already in place on the Oak Ridge Reservation, institutional controls designed to limit uses of the land and resources are less well developed (see Section 2.2.5.) As Reservation lands pass from federal to private ownership, existing organizations will have an increasingly important role in assuring contamination remains isolated from the public. Table 5.4 summarizes the institutional controls and their application by the principal, implementation, and oversight stewards. Using existing local organizations whose functions meet the institutional and stewardship needs of the Reservation has four distinct advantages:

1. Establishes long-term stability for the stewardship program;
2. Creates a minimal number of new duties to be authorized and funded;
3. Allows the use of current local government enforcement capabilities;
4. Promotes immediate acceptance of the stewardship program.

This section provides an overview of the types of institutional controls that are likely to be needed for each watershed on the Oak Ridge Reservation (see Figure 4.1) in keeping with the EUWG end use recommendations. (See Appendix D for copies of the EUWG recommendations.) It does not describe legal measures needed to enforce institutional controls. The Stewardship Committee recognizes that the federal government is the principal steward and responsible for all monitoring, maintenance, and any future remediation under CERCLA. (See Appendix F for a copy of Section 120(h)(3).) These recommendations are not intended to replace any regulatory or oversight functions of the federal or State governments.

The core of an institutional control system for stewardship of released land will be use of existing local property records and land use controls. Due to the presence of disposed radioactive and chemically hazardous waste and residual contamination on the Reservation, stewards must manage additional information about the characteristics of the contaminated areas as well as new land use categories. The following recommendations provide a framework for transferring basic information into the hands of key implementation stewards.

- All property on the Oak Ridge Reservation, regardless of current or expected future ownership, should be parceled and registered in all appropriate local property transfer management systems (e.g., Roane and Anderson County Registers of Deeds).

Table 5.4 Institutional Controls and Their Application by Stewards

	Principal Steward	Implementation Stewards								Oversight Stewards	
Institutional Controls	Federal Gov't. (DOE)	DOE Contractors	Federal Gov't.	State GIS System	Register of Deeds	OR Regional Planning Commission	Property Assessor	School/ College Library	Realtor/ Seller	Environ. Regulators	Local Oversight
Deeds, Easements	Generate	—	—	Use	Archive-Annotate	Use	Use	—	Generate, Use	—	Use
Parcel Maps	—	Generate, Archive, Use	Use	Archive	Archive - Annotate	Archive, Use	Use	Archive	Use	—	Use
CERCLA Reports	Generate	Generate, Archive	Use, Archive	—	—	Use	—	Archive	—	Review/ Concur	Use
Parcel Waste Descriptions	—	Generate, Archive	Use, Archive	Use	Use	Use	Generate, Archive, Annotate	Archive	Use	Use	Use
Parcel Zoning	Use	—	—	—	—	Generate, Archive	Use	—	Use	—	Use
Permits	—	—	—	—	—	Generate	—	—	Use	Generate	Use
Compliance Bonds	—	Use	—	—	—	Generate	—	—	—	Use	Use
Notice to Buyers	Generate	—	—	—	—	—	—	—	Generate, Archive	—	Use
Parcel Access Controls	—	Generate	—	—	—	—	—	Archive	—	Generate	Use

There may be additional, incidental users of all institutional controls.

- Parceling should be done according to the expected contamination profile and end use following remediation. Key information on contamination remaining on the Oak Ridge Reservation should be recorded on maps and deeds, preferably extensions of the residential area grids currently used by the City of Oak Ridge. The Reservation maps must be retained by the City and updated periodically as remediation is completed. Any deed restrictions, easements, or property rights retained by the federal government to ensure safe use of the land should be recorded as part of the deed. All transfers of ownership of such land would be subject to State laws similar to those governing Notices to Buyers. (See Appendix G for copies of Notices to Buyers.) Past land use or the existence of substantive contamination should be explicitly stated on the State forms required of realtors and sellers.

- The City Council, acting through the Oak Ridge Regional Planning Commission, should establish additional land use categories for land devoted to long-term disposal of hazardous wastes. Such property should be described on a "parcel" map submitted to the City for approval and subsequent registration with the County Register of Deeds. The use limitations should be established by ordinance to enable the enforcement of stewardship controls on privately owned land.

- The Counties' Registers of Deeds would preserve and provide accessibility to information about the condition of Reservation land.

- Copies of parcel maps should become part of the City's planning records to provide for redundancy of information and enforcement of land use restrictions. As an additional precaution, the City of Oak Ridge tax records should note the presence of contamination in the existing "Additional Description" field.

- The Oak Ridge City Council should assign responsibility for the City's oversight of the stewardship program to the Environmental Quality Advisory Board or a similar group. This oversight is in addition to the functions of the Oak Ridge Regional Planning Commission and includes responsibilities such as overseeing the overall effectiveness of the stewardship program.

- Parcel maps and any additional information needed to describe Reservation land should be placed in the State Parcel Mapping System. It thus becomes part of the State Records and Planning Systems and is available to the public in digital form, which meets the need for redundancy and availability to the public.

- The State should add categories of long-term waste disposal and waste residuals to the list of required Notices to Buyers. This should reflect CERCLA 120 (h) (3) deed requirements.

5.4 A STEWARDSHIP INFORMATION SYSTEM FOR THE OAK RIDGE RESERVATION

Retention and availability of information is essential to an effective long-term stewardship program. Because there will be a legacy of contamination on the Oak Ridge Reservation, it is vital to establish a tradition of responsible stewardship that preserves information, ensures its accessibility, and educates future generations.

The Stewardship Information System must provide the necessary information and integrate the many activities of individual stewards, stewardship operations and institutional controls.

An important characteristic of an effective Stewardship Information System will be its ability to withstand future political and fiscal uncertainties. A dedicated stand-alone system is vulnerable to shifting priorities. Thus, the Stewardship Committee believes the best solution is to design a Stewardship Information System which, for the most part, is an integral extension of existing systems whose purposes meet essential, long term societal needs that cannot be abandoned. Multiple sources and custodians of information will help to ensure that information remains current, accurate, and available.

An effective Stewardship Information System must:

- Provide information to meet the needs of current and future stewards for adequate oversight and evaluation of contaminated lands to ensure the ongoing protection of human health and the environment;
- Be accessible, understandable, and in a format usable by the public; and
- Provide information that meets the needs of current and future property buyers, sellers, and planners.

The following sections do not include the detailed decisions necessary to establish a final Stewardship Information System; rather they specify broad components of a system and provide guidance for implementation. Since the Stewardship Information System will augment existing information systems, the details of implementation are best specified by custodians of those systems.

5.4.1 Organizing a Stewardship Information System

The range of information required for stewardship is broad, including information about land; location and nature of wastes; historic background; and the status of remediation activities. Information providers must work together to ensure that information users' needs are met and that information is adequate, timely and accurate. Users of a stewardship information system would expect at least the following technical information for a remediation site:

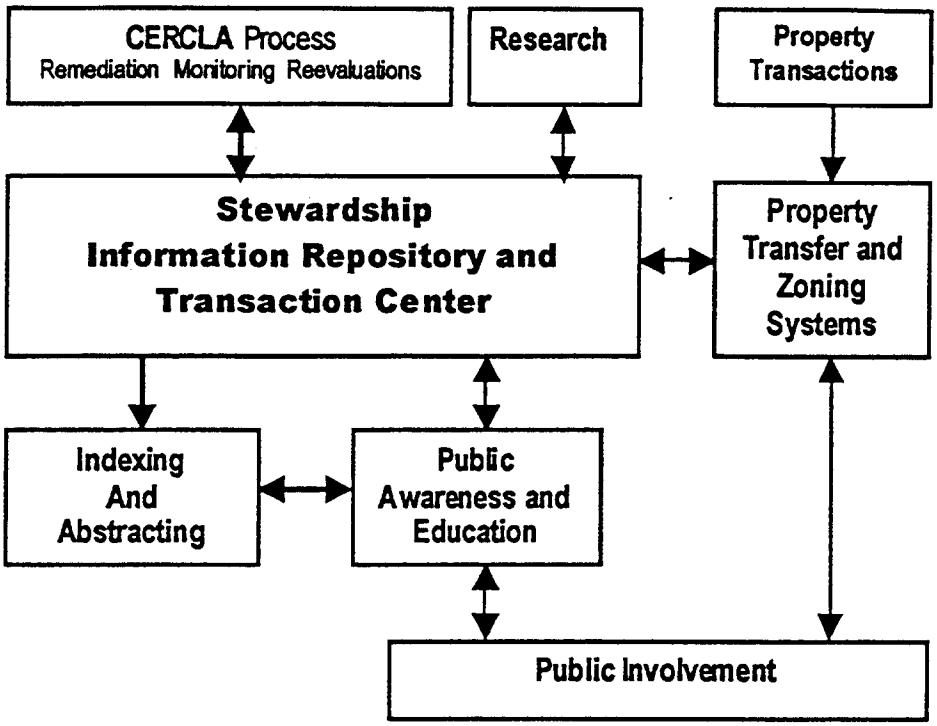
- Physical features of the site, including soil and fill characteristics and hydrogeology;
- Contaminant source(s) and matrix materials believed to remain onsite, including their physical and chemical forms;
- Details of the physical and institutional controls required to maintain remedial objectives;
- Expectations for contaminant migration and attenuation;
- Trends in monitoring results; and
- Other data that might be needed for future risk assessment of the site.

For a site as complex as the Oak Ridge Reservation, knowledgeable staff must be retained (probably through a stewardship research program) to enter data, correctly interpret past entries, and annotate bibliographic entries to help users find relevant information.

Figure 5.1 is a proposed Stewardship Information System that uses existing organizations when possible. It describes the sources, repositories, and flow of information.

It is important that an information system is functional during remediation so that sufficient information and references are included and integrated with existing property transfer and use systems. The nature and location of residual contamination must become part of the permanent land use records. The Oak Ridge Reservation should be parceled and registered according to the expected contamination profile and end uses following remediation, so that the information becomes an integral part of long-term archives.

Figure 5.1 Organization of a Proposed Stewardship Information System for the Oak Ridge Reservation



5.4.2 Components of a Proposed Stewardship Information System

Components of the proposed Stewardship Information System are summarized in Table 5.5 along with an indication of content, custodians, users, and brief comments. A functional description of each component is found in Appendix H. Custodians are generally implementation stewards. The source of most information is DOE and subsequent landowners. The system is intended to be consistent with CERCLA Section 120 (h) (3), which requires that a warranty deed with associated contaminant information accompany the transfer of contaminated federal land.

5.4.3 Information Flow in a Proposed Stewardship Information System

The information flow described below goes into effect as property is transferred to the private sector. Throughout a stewardship program, it is important that key information is obtained and transferred to appropriate stewards. A stewardship information repository and transaction center with a Transaction Log Database (see Table 5.6) is needed to track information and to identify which parties and actions are required based on the information.

Table 5.5 - Components of a Stewardship Information System

Component	Content	Custodian	Primary Users	Comments
Stewardship Repository	All relevant DOE/contractor reports	Environmental Management Data Management Center	All	Documents reports of all types
Abstracts & Indexing	Report & literature abstracts	Office of Science and Technology Information or other service	All	Comprehensive coverage of Oak Ridge stewardship literature including on-line retrieval
Archives	Archived reports	National Technical Information Service	All	Microfiche & hard copy archive
Record of Site Access & Activity Controls	Hunting , fishing & recreation controls	Tennessee Wildlife and Recreation Agency & City Parks Department	Site recreational users	Current rules and limitations
Stewardship Web Site	Graphics, report summaries, links	Environmental Management Data Management Center	Web users	Also indexing & abstracting
Public Library	Public interest information	Local libraries	Public	Non-technical, public interest documents, ORR videos
School Library	Teaching aids	Local schools	Teachers, students	Documents, videos, books
Public Awareness	Legal notices, meetings, other	DOE & others	Public	General public awareness program
County Records	Land deeds, subdivision plats	Register of Deeds	Realtors, developers, lawyers	Both Roane & Anderson, includes easements & restrictions
	Reports	Register of Deeds	All	Detailed documentation of residual waste & restrictions
	Parcel maps	Property Assessor	All	Showing waste location with key to DOE documentation
City Records	Parcel maps	Planning Office	Planners, Regional Planning, Environmental Quality Advisory Board	Zoning and use restriction information Waste location plus supporting information
	Annotated tax records	Oak Ridge Tax Office	All	Redundancy to alert title searchers
State Parcel Maps	Parcel maps	State Office of Information Resources (Finance and Administration)	Planners, realtors, developers, public	Part of the new State Parcel Mapping System with a waste overlay, input from DOE, redundancy and public access
State Notices to Buyers	Waste descriptions	Realtors, sellers	Realtors, sellers, buyers	Kept by realtors for three years, these are now required by law.

Table 5.6 Schematic Information Flow in a Proposed Stewardship Information System (SIS)

Stewardship Information System Component	Project Transactions						
	Remedial Investigation/ Feasibility Study	Record of Decision	Completion of Remediation	Land Sale	Re-sale(s)	Site Re-evaluation(s)	Clean Release
Transaction Log Data Base	T1	T2	T3	T4	T5	T6	T7
Stewardship Working Repository & Archive (1)	RI/FS Report	ROD and post-ROD documents	Remedial Action Report	Record	Record	5 Year Review Report	Delisting Report (2)
Indexing & Abstracting (3)	I&A	I&A	I&A			I&A	I&A
Public Information (4)	Web, library, schools	Web, library, schools	Web, library, schools	Web, library, schools	Web, library, schools	Web, library, schools	Web, library, schools
County Register of Deeds	—	—	Deed(8)	Warranty deed	Deed	—	—
Oak Ridge Tax Office (5)	—	—	Annotate (9)	Annotate	Annotate	—	Remove from SIS
Oak Ridge Regional Planning Commission (6)	—	—	Zoning (9), Parcel Map	Zoning, Parcel Map	Zoning, Parcel Map	Update	Remove from SIS
State Parcel Mapping System(7)	—	—	Parcel Map	Parcel Map	Parcel Map	Update	Remove from SIS
State Notices to Buyers	—	—	—	By seller	By seller	—	—

(1) Report includes any documents, such as maps, data logging, etc. associated with the indicated process step
(2) Delisting is defined as removal from the National Priorities List
(3) Indexing and abstracting should routinely follow the published reports. The principal steward need only ensure it is implemented. This does not preclude additional abstracting for use in Stewardship Information System activities, such as the web site and public information collections.
(4) The web site should shadow the transaction log and supply additional status, summary, and descriptive information. The library collection should include multimedia material appropriate to the Oak Ridge population. The schools should be supplied with multimedia information suitable to an "Oak Ridge Reservation Stewardship" curriculum at several grade levels. This material will not necessarily track each process step.
(5) The Oak Ridge Tax Office records will indicate the presence of waste in the existing "additional description" field.
(6) The Oak Ridge Regional Planning Commission and supporting City staff records to show ownership, waste location and characteristics, and zoning or use restrictions. The Oak Ridge Regional Planning Commission and City staff are the primary local enforcement bodies, and are in addition to any required CERCLA oversight or citizen oversight.
(7) The State Parcel Mapping Systems to reflect ownership, waste location, and waste characteristics.
(8) The term "Deed" includes any associated institutional control, such as easements, restrictions, etc. Each contaminated parcel has a deed recorded. The deeds and associated plats are issued at this time to ensure that contaminated parcels are administratively identified and isolated from uncontaminated land.
(9) These entries do not affect current land use but are required to activate the Stewardship Information System. They should reflect the actual state of the land. Any restrictions become binding when the land is sold.

An information system is characterized not only by its content, but also by what events trigger inclusion of information into the system. As transactions occur in the system, such as property transfer or collection of monitoring results, these events should initiate a well-defined set of actions (shown schematically in Table 5.6 for the life cycle of one stewardship project). The completion of a project transaction (top row) will trigger those activities shown in the corresponding Stewardship Information System component column. Activities under the "Completion of Remediation" column are very important as they trigger information in all subsequent Stewardship Information System components; such information is important to the continuing stewardship needs. The Transaction Log Database provides for control of the system and a computer accessible digest of the system's contents. "Release" implies a clean release of a parcel from the stewardship program. The majority of these activities are small increments to the normal, ongoing duties of the stewards. All stewards should have access to the Transaction Log Database to verify that activity records are current. Each transaction entry will contain a myriad of summary and status information.

The foregoing description of a proposed Stewardship Information System includes those portions of a total information system that are necessary to preserve stewardship information and to ensure appropriate interactions among implementation contractors, federal, State and local government stewards. No detailed attempt is made to define the portion of an information system necessary for ongoing, day-to-day operation of a stewardship program, such as surveillance, monitoring, and maintenance. In addition, other components of a Stewardship Information System may be found necessary to facilitate efficient operation of a stewardship program.

5.4.4 Major Actions Required to Implement the Proposed Stewardship Information System

The following is a list of the major actions needed to implement the proposed Stewardship Information System. Some steps should be taken immediately by DOE as they reflect Remedial Investigation/Feasibility Study actions. Many minor steps are not listed.

- DOE should develop and integrate Stewardship Information System components, with the aid of relevant stewards.
- The Transaction Log Database (including transaction modules that provide notice to appropriate stewards of completion of a transaction along with information for compliance) must be developed and implemented.
- Once the above steps are taken, the Stewardship Information System should be updated for all past actions, especially transactions T1 and T2, as defined in Table 5.6.

- Subsequently, transactions must be initiated in approximate real time. Note that the major effort occurs on or before the "Completion of Remediation" (T3) when the majority of information is transferred to the Stewardship Information System.
- All property on the Oak Ridge Reservation, regardless of current or expected future ownership, should be entered into the property transfer system as recommended in Section 5.3. (also see Figure 5.1.)
- Necessary Oak Ridge Reservation waste disposal thematic overlay information should be incorporated into the State Parcel Mapping System.
- The Oak Ridge National Laboratory Geographic Information System should coordinate activities with the State Parcel Mapping System.
- When DOE releases remediated land, other stewards must initiate activities to ensure the inclusion of the land in the property transfer system.
- Periodic status reports from the Transaction Log should be used to verify the currency of each Stewardship Information System component and to provide reports to the implementation and oversight stewards.

5.5 RESEARCH ON THE OAK RIDGE RESERVATION

The need for research in a long-term stewardship program is predicated in part on the knowledge that stewardship encompasses long-term custodial responsibility and a responsibility to understand the behavior of a waste site in order to predict its future performance and to recommend changes in remediation and/or stewardship requirements.

A stewardship program routinely includes surveillance, which provides information about waste related problems that are reasonably well understood (e.g., concentration and migration of known contaminants). Stewardship also requires research that results in understanding of phenomena that are not well understood (e.g., uptake and effects of contaminants on human, plant, and animal populations). Such research contributes to predicting future conditions and safety at a waste disposal site.

For some of the Oak Ridge Reservation waste sites, as well as other similar waste sites, it is expected that within three hundred years the nuclear radiation levels will be reduced by natural decay and there will be opportunities to re-evaluate site conditions and remediation. Thus, stewards must preserve applicable existing data and new research data, and evaluate future data needs in the following areas:

1. The long-term performance and safety of disposal sites and engineered waste cells.

2. The effectiveness of hydrological isolation and limited source removal for prevention of contaminant migration.

3. The migration of contaminants by groundwater and biota.

4. The rates of natural decay of organic compounds and the fate of heavy metals in groundwater plumes.

5. The effectiveness of natural cleansing processes.

6. The human health effects of chronic low-level contaminant exposures.

7. The long-term impact of contaminants on the environment.

While the above list may not be complete, it indicates how little is known about the disposal of radioactive and chemically hazardous wastes. The Oak Ridge Reservation provides a unique opportunity for this type of research. There are ongoing research projects in uncontaminated areas that can serve as controls, and advanced analytical laboratories and other capabilities to support such research efforts.

5.6 FUNDING OAK RIDGE RESERVATION STEWARDSHIP

Expected annual funding requirements for the Oak Ridge Reservation stewardship program must be established. Initial estimates place the costs at approximately $17 million per year.[11] While the most reliable form of funding and the preference of the Stewardship Committee is the development of a privately-held trust, the difficulty of creating an endowment large enough to provide this level of funding is recognized.

The Stewardship Committee recommends an incremental and cooperative approach to creating a stable source of funding necessary for long-term stewardship. While many details must be worked out, the following recommendations would help the process begin in earnest.

1. **Develop an Administrative Focus**
   Until such time as independent funding is established, DOE should request stewardship funding from annual appropriations. These costs should be carried in the annual DOE budget as a separate line item to ensure visibility. Prioritization of this request by DOE and its active advocacy by DOE-Headquarters

[11] U.S. DOE Oak Ridge Operations Office. June 1998. U.S. DOE Environmental Management Program, Accelerating Cleanup: Paths to Closure, DOE/OR/01-1746.

in annual budget requests are expected to alleviate concerns the State of Tennessee currently has about stewardship funding.

Oak Ridge stakeholders must work in concert with citizens from other DOE sites to press Congress for hearings, and will participate in those hearings, on the subject of stewardship, its required funding, and the necessity of funding in perpetuity. These hearings must be directed in part to establish a method of financing (e.g., endowment or entitlement.) It is important that stakeholders, DOE, EPA, and the State work toward a unified approach for stewardship during congressional hearings.

2. **Develop a Stewardship Fund**
   The federal government should establish a fund that will generate the required annual income for stewardship. A recognized financial authority, taking into account inflation and restrictions on modes of investment, should calculate the dollars required for a stewardship fund. As each remediation project is budgeted in a Record of Decision, a line item would be entered for its pro-rated share of the stewardship fund. DOE will plan to request these funds in conjunction with all future budget requests. To ensure appropriate control over expenditures for stewardship, congressional funding for the activity will specify that the principal steward has control over the income derived from the fund for stewardship, without any additional congressional approval or authorization. Congress will maintain the authority to audit expenditures to assure that the fund is appropriately used. As an alternative, especially after remediation is complete, an endowment can be established to be managed by a non-profit corporation.

3. **Augment Fund as Necessary**
   If funds are insufficient to cover stewardship expenses, the principal steward is responsible for incremental funding through annual appropriations. Long-term stewardship funding is not expected to cover the costs of a future major failure of a remedial action. Should such an event occur, the federal government is obligated under CERCLA to fund whatever cleanup actions are determined necessary by regulatory authority.

5.7 SUMMARY OF KEY RECOMMENDATIONS FOR STEWARDSHIP ON THE OAK RIDGE RESERVATION

- DOE (acting as an agent of the federal government) must acknowledge and accept its responsibility as principal steward of the Oak Ridge Reservation.

- By the end of 1999, DOE should develop a stewardship plan with the cooperation of the implementation and oversight stewards.

- DOE must make stewardship requirements an integral part of all CERCLA decision documents.
- DOE should establish an annual budget for stewardship.
- Until such time as independent funding is established, DOE should request stewardship funding as a line item in annual appropriations.
- The Congress should establish a fund that will generate the required annual budget for stewardship.
- DOE should establish a Stewardship Transition Team in 1998 and a Citizens' Oversight Board for Stewardship for long-term public involvement in stewardship.
- DOE should identify the stewards required for implementation of the stewardship plan.
- DOE should ensure that all potential stewards accept responsibility for implementation of their portions of the stewardship plan.
- DOE should initiate a Stewardship Coordinating Committee by the end of 1999 with representatives from each organization that has stewardship responsibility.
- DOE should establish a Stewardship Information system consistent with recommendations in Section 5.4.
- DOE should establish a stewardship research program that contributes to better assessments of the exposure and risks of contamination, remedial technologies, and stewardship requirements.
- The Oak Ridge City Council should assign responsibility for the City's oversight of the stewardship program to the Environmental Quality Advisory Board or a similar group.
- The Oak Ridge City Council should establish any additional land use category(ies) required for land used for long-term disposal of "hazardous" wastes.
- The State should add long-term waste disposal and residual waste categories to the list of required "Notices to Buyers."

6.0 CONCLUSIONS

The Stewardship Committee affirms that a highly visible and active stewardship program for the Oak Ridge Reservation is necessary for the continued protection of human health and the environment following remediation. Effective stewardship serves to cope constructively with any negative community image associated with contaminated environmental media resulting from Department of Energy missions.

The Stewardship Committee concludes that a stewardship program for the Oak Ridge Reservation, based on the elements described in Section 2.2, must be established now. A range of stewards should be recognized and coordinated to continue current stewardship duties and to prepare for future activities. A Citizens' Oversight Board for Stewardship should be developed soon and charged with ensuring that stewardship activities are implemented. This group would have broad influence but little explicit power. A volunteer citizen Stewardship Transition Team should be formed in 1998 to serve until a Citizens' Oversight Board can be established.

Only when a stewardship program is in place for the Oak Ridge Reservation, can EUWG members justify support of remediation plans that result in residual contamination on the Reservation.

ACKNOWLEDGMENTS

The Stewardship Committee appreciates the dedication of the volunteer members of the End Use Working Group (EUWG), Friends of Oak Ridge National Laboratory and other participants, as well as the support provided by DOE and its contractor staff in meeting the Committee's information needs. Doug Sarno of Phoenix Environmental Corporation effectively provided facilitation and technical assistance. Karen Bowdle's coordination of the stewardship effort was essential to its success. Without the encouragement and support of Rod Nelson, Assistant Manager for Environmental Management of DOE Oak Ridge Operations, and Margaret Wilson, leader of the local DOE Federal Facilities Agreement Program, this effort would have been impossible. The DOE Oak Ridge Operations Environmental Management Program financed this study as part of the EUWG activity. Local public officials have been helpful in describing how stewardship requirements relate to their ongoing operations.

LIST OF APPENDICES

APPENDIX A
The End Use Working Group[1]

[1] Additional information about the End Use Working Group can be found by consulting the July 1998 Final Report of the End Use Working Group. This report is available on the DOE Oak Ridge home page at ornl.gov/doe_oro/em/emhome.html or by calling the Information Resource Center at 423-241-4582.

In late 1996, DOE issued a draft proposal on its preferred remediation method for four surface impoundments at Oak Ridge National Laboratory (ORNL). The State believed that DOE's remediation decisions lacked community involvement and recommended that any remediation decision for the surface impoundments should include broadly-based public involvement.

In response to the State's recommendation, DOE asked the Oak Ridge Reservation Environmental Management Site Specific Advisory Board (ORREMSSAB) to initiate a process to gain better understanding of community values and desired future uses for contaminated areas on the Oak Ridge Reservation. The ORREMSSAB determined that a broader independent group would be needed for such an effort.

A steering committee from the ORREMSSAB was formed to initiate the effort and to encourage stakeholders to get involved because of the importance of the effort to remediation planning. An experienced technical facilitator was hired to help the new group direct its efforts and maintain its focus. After some debate, it was decidedthat the name "End Use Working Group (EUWG)" best described the issues facing the group.

In January 1997, the ORREMSSAB sponsored a public meeting to seek volunteers for the newly formed EUWG. More than 100 attendees discussed issues and a process for the EUWG. More than 20 individuals became members of the EUWG, while a similar number requested EUWG materials.

The DOE asked the EUWG to develop:

- Recommendations for end uses of contaminated areas on the Oak Ridge Reservation; and
- Community values that could be used to guide DOE's remedial action decision-making process.

The EUWG process preceded CERCLA Records of Decision for the Oak Ridge Reservation watersheds, with the result that the Group's recommendations and Community Guidelines will be factored into overall remediation planning. The EUWG, which completed its work in June 1998, did not replace other public involvement opportunities, nor did it make recommendations on specific remediation levels or technologies.

Approximately 20 EUWG members met almost every two weeks from February 1997 through June 1998. In addition, a volunteer steering committee of four to six members met before and after each meeting; the steering committee helped direct the content, scope, and format of information and presentations for each meeting.

The EUWG membership was diverse and included members from the following stakeholder organizations: Oak Ridge Environmental Peace Alliance, Citizens' Advisory Panel of the Local Oversight Committee, Oak Ridge Reservation Site Specific Advisory Board, Friends of Oak Ridge National Laboratory, Oak Ridge Environmental Quality Advisory Board, Oak Ridge City Council, League of Women Voters, Oak Ridge Coalition For a Healthy Environment, and the Oak Ridge Regional Planning Committee. Participation by individuals with different perspectives enhanced the

quality of discussions and the development and evaluation of alternative end uses for contaminated areas within each watershed.

Membership was open to all stakeholders interested in the future of the Oak Ridge Reservation, and visitors regularly attended and contributed to discussions. Steering committee meetings were also open to anyone who wished to attend. No formalized registration procedures or prerequisites for membership existed. The EUWG asked only that its members attend and actively participate in meetings. Meetings were videotaped for airing on public access television; these videos also provided members who were absent from meetings the opportunity to review the group's activities.

As EUWG deliberations progressed, it was apparent to the Group that additional issues related to end use recommendations needed to be evaluated:

- the relationship of the use of contaminated groundwater and surface water to recommended end uses for contaminated areas;
- the need for a long-term stewardship program to protect human health and the environment when an end use recommendation results in residual contamination ;
- the need for an onsite waste disposal facility somewhere on the Oak Ridge Reservation.

Thus, the EUWG formed two ad hoc committees to examine issues important to the end use process. The first was the Community Guidelines committee, followed by the Stewardship Committee. The committees' progress was regularly communicated to the EUWG and the ORREMSSAB during their general meetings.

APPENDIX B
Stewardship Committee Participants

Stewardship Committee Participants

Stanley Auerbach
Al Brooks
Mary Bryan
Susan Gawarecki
John Griess
Josh Johnson
Roger Macklin
Richard Mathis
Norman Mulvenon
Bill Pardue
Bob Peelle
Elizabeth Peelle
Bert Schappel
Sam Suffern
Lorene Sigal
Herman Weeren

APPENDIX C
Stewardship Case Studies

Predicting Future Risk and Stewardship Tools in Melton Valley

Melton Valley has many inactive waste disposal sites within a 1,000 acre area. They include burial grounds, seepage pits, contaminated flood plains and deep injected hydrofracture wastes. Most of the disposal activities involved shallow land burial, but in some cases, waste is in contact with groundwater 50 to 60 feet below the surface. In addition, contaminants leached from the buried wastes result in surface water contamination. The contaminated waters flow into White Oak Creek and then to the Clinch River. Contaminated sediment is controlled at White Oak Dam. The radioactivity in Melton Valley is dominated by tritium (with a half-life of 12 years) and strontium-90 and cesium-137 (with half-lives of 30 years.) The hazards from these three radionuclides will diminish in about 300 years. However, the waste disposal sites also are sources of metals, organics, and other longer-lived radionuclides. The EUWG recommendation for Melton Valley is as a restricted access waste disposal area.

Because it is not feasible now to remove the contaminated waste from Melton Valley, long-term stewardship becomes an important part of remediation. Most of the stewardship elements required to protect human health and the environment are already in place in Melton Valley. They include: barriers to entry, engineered barriers to exposure, governmental and proprietary controls, and monitoring, maintenance, and oversight. The missing elements are related to the long-term effectiveness of institutional and physical controls; lack of an integrated information system; and the uncertainty of funding over time.

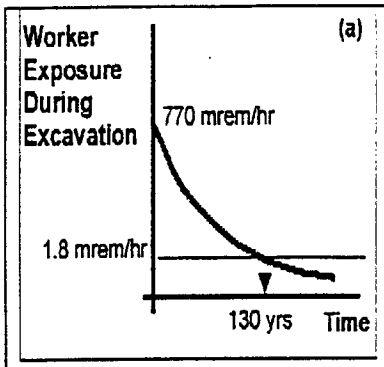
One of the challenges of waste disposal in Melton Valley is relating changes in radioactivity to stewardship requirements. This case study illustrates that controls/activities might be eliminated or reduced in scope as a result of decreasing risk from radioactive decay. (Changes due to contaminant transport were not included in the models.) It is based on data from the Feasibility Study for Melton Valley.[1]

The predicted effects of radioactive decay on worker exposure, strontium-90 concentration at White Oak Dam, and total risk at the Dam are shown in Figure 1. The decreases in radioactivity are related to the time it takes before: excavation of waste is feasible (Figure C1a); strontium-90 is below the drinking water standard (Figure C1b); and water treatment is not necessary (Figure C1c.)

Actions that may be decreased as a result of radioactive decay are described in columns one and two of Figure C2. Actions that may continue indefinitely are shown in column three. Prediction of such changes contributes to long-term planning for stewardship and remediation. When such planning occurs concurrenty, it invites (1) comparison of the advantages and disadvantages of management in place vs. removal of wastes, (2) critical thinking about costs, and (3) actions to secure the long-term funding needed to ensure the future health and safety of the public and the environment.

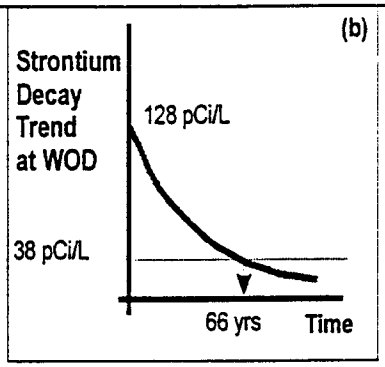
[1] Feasibililty Study for Melton Valley Watershed at Oak Ridge National Laboratory, Oak Ridge, Tennessee, DOE/OR/02-1629/D1, September 1997.

Figure C1. Predicted effects of radioactive decay[1] on worker exposure, ^{90}Sr concentration, and total risk at White Oak Dam (WOD) in Melton Valley,[2] Oak Ridge, Tennessee



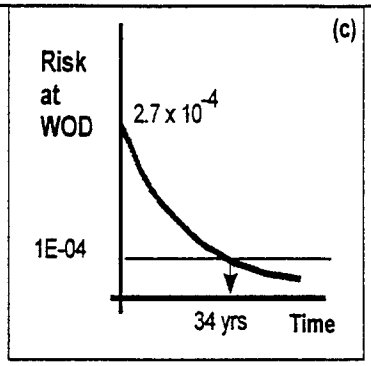
Based on a Solid Waste Storage Area 6 calculation in the feasibility study (DOE/OR/02-1629/D2)

Worker exposure during excavation of buried waste declines below 1.8 mrem/hour after 130 years. The 1.8 mrem/hour is an exposure limit derived using regulatory and ALARA considerations. The calculation estimates decay time required before waste could be excavated with conventional techniques. After 130 years, cesium and strontium levels will have decreased by a factor of 20, and excavation of the buried waste will become increasingly viable. This example is based on worst case conditions at a high activity site.



Based on Figure 3.14 of the remedial investigation (DOE/OR/01-1546/V1&D2)

Strontium-90 concentration at WOD will decrease to less than the proposed primary drinking water standard maximum concentration limit of 38 pCi/L by the year 2064 (66 years from 1998). This prediction is based on the current trend (before any additional remediation of Melton Valley).



Based on Figure 5.2 of the feasibility study (DOE/OR/02-1629/D2)

Total risk at WOD decreases from 2.7×10^{-4} to 1×10^{-4} after a 34-year decay period. This figure is based on Alternative 2[2] in the feasibility study, which does not include water collection and treatment as part of burial ground hydraulic isolation. Although Alternative 5 is the focus of this test case, the Alternative 2 risk reduction curve was used to estimate the decay period needed to reduce risk below 1×10^{-4} when water treatment is not used.

[1]Predictions based on rate of radioactive decay only.

[2]Based on data in the *Feasibility Study for Melton Valley Watershed at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/02-1629/V1&D2, April 1998, and the *Remedial Investigation Report on the Melton Valley Watershed at Oak Ridge National Laboratory, Oak Ridge, Tennessee*, DOE/OR/01-1546/V1&D2.

The fact that conditions in waste disposal areas change over time highlights the importance of periodic reviews, retrievable information, ongoing education, and research to improve risk assessment assumptions. Furthermore, it is obvious from this test case that planning for stewardship must accompany planning for remediation.

Figure C2. Potential Changes in Stewardship Tools With Time in Melton Valley

Actions That May Decrease Or Stop After 34 To 66 Years	Actions That May Decrease Or Stop After 66 To 130 Years	Actions That May Continue Indefinitely Or Until All Material Is Excavated
Soil cover maintenance[1]	Cap repair/replacement[1]	Barriers to entry, governmental and proprietary controls
Water treatment plant operation and maintenance	Shallow groundwater management, monitoring of upgradient diversion trenches (related to the life of caps – 66 to 130 years)	Groundwater monitoring (perimeter and site-wide, generally on an annual basis)
Shallow groundwater management, monitoring of downgradient collection drains (related to the life of the water treatment plant – 34 to 66 years	Use of piezometers (related to the life of the caps – 66 to 130 years)	Sediment monitoring minimal (sediments are removed in Alternative 5)
Surface water monitoring (change to quarterly basis)	Surface water monitoring (change to semi-annual basis)	Radiation surveys and inspections (annual basis)

[1] The impact of strontium-90 on risk at White Oak Dam will have decreased by a factor of 4 to 20.

The Signs of Stewardship

Lower East Fork Poplar Creek (LEFPC) begins at the Oak Ridge Y-12 Plant and runs west for 15 miles through the City of Oak Ridge to a point just below the East Tennessee Technology Park (formerly K-25) where it joins with Poplar Creek. In 1983, mercury and smaller quantities of other contaminants (e.g., heavy metals, radionuclides, organic compounds) were disclosed to be in the water, sediment and fish in the creek. Mercury was used in weapons production at the Y-12 Plant from 1953 to 1963 and releases occurred from normal plant operations and accidental spills.

In 1983, the Tennessee Department of Environment and Conservation (TDEC) posted signs warning the public that the creek was contaminated and that fishing and water contact should be avoided. In 1992, signs were added and damaged signs were replaced by the Department of Energy (DOE). In 1995, a CERCLA Record of Decision was issued for remediation of the contaminated creek (including signage.) In 1997, TDEC DOE Oversight Division conducted a survey of the advisory signs starting at the Y-12 Plant and continuing downstream to about mile 3.0. They found that the signs were vandalized or removed. TDEC and DOE exchanged letters, each assigning responsibility for the signs to the other.

During a public meeting, preceding publication of the Record of Decision, the public questioned the continuing need for advisory signs after remediation. DOE's response, published in the Record of Decision was: "The advisory signs fall under the purview of the State of Tennessee. Upon completion of cleanup, the State will re-evaluate the need for advisory signs." Remediation of the creek was completed in 1997, but the issue of the responsibility and need for advisory signs is still unresolved.

In 1998, a member of the EUWG Stewardship Committee decided to investigate the condition of the advisory signs along the creek to determine (1) the value of signage as an institutional control, and (2) the status of stewardship for the creek because remediation removed the contamination "hot spots." Residual contamination, below the level requiring remediation, remains in the flood plain of the creek.

After multiple inquiries of City, County, State, and federal offices, TDEC provided a map of signage along the creek. Along the area selected for a walk-over, the creek is bordered by an armory, a school, low-income housing, children's athletic fields, small businesses, apartment buildings, and a gas station. According to the map, eight signs were posted along this stretch of the creek. Six of the signs were found and two of these were vandalized as shown on page C-6.

Discussions with DOE, TDEC, and the U.S. Environmental Protection Agency Region 4 (EPA) disclosed that DOE's post remediation responsibilities are found in CERCLA documentation (i.e., the Record of Decision). The separate responsibilities of EPA, TDEC and others are found elsewhere in federal and state regulations and requirements.

Discussions with TDEC revealed that groundwater and surface water belongs to the State by sovereign right, thus the posting of warning signs is the responsibility of TDEC.

A biennial report, The Status of Water Quality in Tennessee 305(b) Report for 1996, lists Lower East Fork Poplar Creek as having a fish tissue advisory for mercury and polychlorinated biphenyls. In an 18 February 1998 newspaper article, the manager of the TDEC/DOE Oversight Office was quoted as saying that mercury contamination is below the regulatory limit for posting of warning signs, but the bacteria count is high enough to leave the signs in place. According to the newspaper article, the signs will be removed after the City of Oak Ridge completes rehabilitation of the sewer lines. In April 1998, a letter was sent to the manager of the TDEC Knoxville Field Office asking for clarification of the signs and advisories, but to date no reply has been received. The ecological status of Lower East Fork Poplar Creek is well known. Scientists at Oak Ridge National Laboratory have sampled the creek and its biota since 1983. The data are posted in the Laboratory's environmental data base and are available to DOE, EPA, TDEC and others to use for their decision making.

This case study highlights the failure of an institutional control (i.e., signage) when (1) responsibility for stewardship is unclear (i.e., DOE or TDEC) and (2) existing data that could contribute to removal of unnecessary signs and advisories are either unknown or ignored by the decision makers. The validity and condition of advisory signs are important to the image that the City of Oak Ridge projects to residents, visitors, and potential businesses. A Citizens' Oversight Board, a Stewardship Coordinating Committee, and Stewardship Information System would define responsibilities, provide current information/data, and add an element of order to the confusion found during this case study.


STREAM CONTAM


VARNING

To Eat or Not to Eat – The Fish in Lower Watts Bar Reservoir

In 1995, risk assessment and measurements of polychlorinated biphenyls (PCBs) in fish from Lower Watts Bar Reservoir (LWBR) showed that levels of PCBs were high enough to warrant a fish advisory[1] for consumption of catfish and bass. The advisory says consumption should be limited to one meal per month and that children, pregnant women, and nursing mothers should not consume the named species. The advisory also says that adverse health effects are considered the result of long-term exposure, and an infrequent meal of listed fish is not believed to have a measurable health risk.

Nevertheless, posting the LWBR advisory resulted in decreased tourism and fishing, and economic hardships for business people in the area. Several other neighboring water bodies were studied and only one of two adjacent bodies of water (having only nominal differences in fish PCB concentrations) was posted. Of course, even modestly larger consumption of fish from the unposted water body would lead to similar levels of PCB ingestion. This fact was recognized by residents and local business people and the inequities of the situation have led to further evaluation of conditions in the Reservoir.

In 1998, the Agency for Toxic Substances and Disease Registry completed an Exposure Investigation of those who eat moderate to large amounts of fish and turtles from LWBR compared to those in the general population. The investigation showed that blood serum PCB levels in 116 people who were above average consumers of fish and turtles from LWBR were not significantly greater than PCB levels in the general population. This raises questions about the validity of the risk assessment assumptions used for the fish advisory, especially regarding uptake and retention of PCBs. Thus, changing conditions, new data, and equity considerations are reasons for re-evaluation of the LWBR fish advisory.

This case study highlights the value of research to stewardship. New site-specific information may reveal that initial assumptions were more conservative than need be and that institutional controls can be eliminated or relaxed. On the other hand, research and monitoring data can document failure of remediation methods and the need for enhanced or new institutional and/or physical controls. In either situation, an effective stewardship plan must be flexible and able to accommodate change. At this time, there is not an effective review process for re-evaluating and changing institutional controls. A Stewardship Information System and a Stewardship Coordinating Committee are vehicles for addressing the changing requirements of stewardship.

[1] Tennessee Wildlife Resources Agency, 1977. Tennessee Fishing Regulations, March 1, 1997 – February 28, 1998.

APPENDIX D
End Use Working Group Recommendations[1,2,3]

[1] The Final Report of the Oak Ridge Reservation End Use Working Group (July 1998) should be consulted for a full understanding of the EUWG recommendations. The report is available on the DOE Oak Ridge Operations site on the world wide web: ornl.gov/doe_oro/emhome.html or by calling the Information Resource Center at 423-241-4582.

[2] WAG as used on the maps accompanying the Bethel Valley and Melton Valley recommendations is the acronym for a waste area grouping of solid waste management units and/or other areas of contamination that are geographically contiguous or are located within defined hydrogeologic units.

[3] Brownfield as used in the Bethel Valley recommendation and also in the Community Guidelines refers to a previously used industrial site, in contrast to an unused greenfield site.

OAK RIDGE RESERVATION END USE WORKING GROUP

RECOMMENDATIONS FOR THE END USE OF CONTAMINATED LANDS IN THE BETHEL VALLEY AREA OF THE OAK RIDGE NATIONAL LABORATORY

Oak Ridge National Laboratory (ORNL) is a national and local resource, whose preservation and growth are an important part of the long-term vitality of the Oak Ridge community. ORNL needs to remain attractive to both current and new uses. Therefore, it is essential that Department of Energy (DOE) remediation decisions achieve, at a minimum, a controlled industrial end use for the entire ORNL Bethel Valley area.

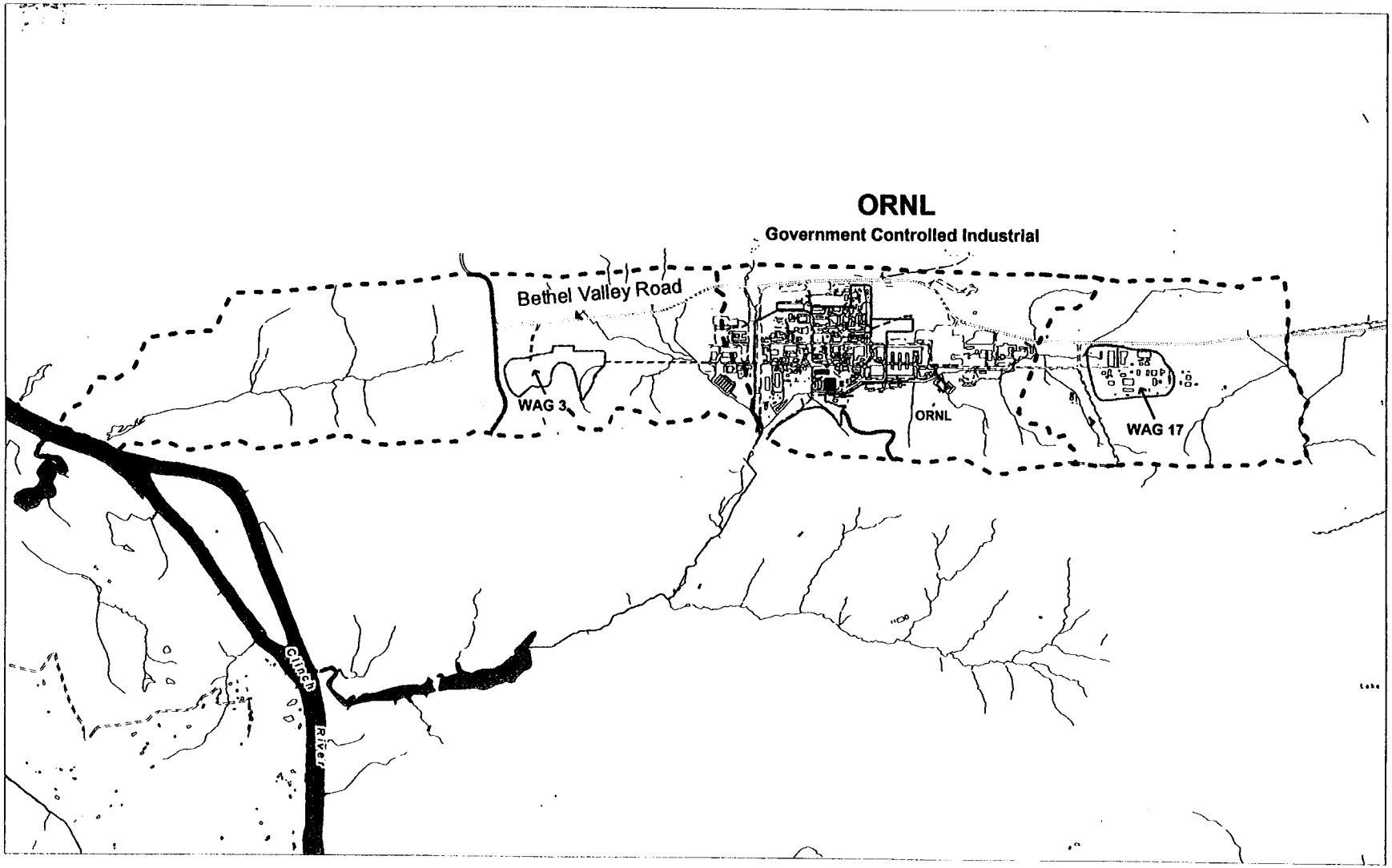
A controlled industrial end use should at least provide for surface use of contaminated lands. Currently, there are areas where contamination results in the need for controlled access. Reducing such areas would enhance the overall viability of the laboratory. Remediation should result in lands that are safe for surface use by laboratory employees.

In making its decision, DOE needs to consider the overall utility of ORNL, recognize the variety of uses needed to support an active and vital laboratory environment and use remediation resources wisely. DOE should make the best practical use of existing brownfields while recognizing that not all land needs to be available for every use. If situations occur where DOE cannot meet the surface use criteria due to excessive risks or costs, these exceptions need to be discussed openly in a public forum.

We the undersigned members to the Oak Ridge Reservation End Use Working Group, have participated in the development of and endorse the above recommendations.

Lorene L. Sigal
Roger L. Macklin
Robert Peelle
[illegible]
[illegible]
[illegible]
[illegible]
Claudia L. [illegible]
Charles W. [illegible]
John [illegible]
Jane Humphrey
Wolf Naegeli
Alfred G. Brooks
William M Parker

May 29, 1997



End Use Map of Bethel Valley

OAK RIDGE RESERVATION
END USE
WORKING GROUP

RECOMMENDATION TO SITE A WASTE DISPOSAL FACILITY ON THE OAK RIDGE RESERVATION

Remediation of the Oak Ridge Reservation (ORR) will generate large volumes of material containing varying degrees of contamination. The End Use Working Group believes that DOE should take a balanced* approach to the disposal of contaminated materials from the ORR. A balanced approach will require construction of an on-site waste disposal facility to manage contaminated materials meeting site-specific waste acceptance criteria. Material not meeting waste acceptance criteria for an ORR waste disposal facility should be disposed of off site.

DOE should consider the following criteria when planning an ORR waste disposal facility:

1. The facility should be located on or adjacent to an area that is contaminated and previously used for long-term waste disposal. After consideration of the End Use Working Group's Community Guidelines, the End Use Working Group believes that the East Bear Creek Valley site is the most appropriate location of the three sites proposed by DOE.
2. Facility design must safely isolate contaminated materials from the environment.
3. For materials with very low levels of contamination, options for safely managing these materials without elaborate disposal requirements should be given meaningful consideration.
4. Waste disposal capacity should accommodate both current and future volumes of ORR remediation waste.
5. Consideration should also be given to creating disposal capacity for non-remediation wastes. If on-site waste disposal capacity is limited for any reason, the first priority should be given to remediation wastes.
6. Perpetual stewardship of the disposal facility and surrounding property must be assured.
7. Focused stakeholder input should be solicited prior to making decisions regarding facility design, waste acceptance criteria, and acceptance of waste from outside ORR.

*A balanced approach is one which recognizes that Oak Ridge's environmental problems should not be solved by shipping all of its waste elsewhere. DOE must take into account the concerns of stakeholders at potential receiving facilities and along transportation routes. DOE must also take into account the total costs and risks associated with managing wastes on site *vs.* off site.

We the undersigned members to the Oak Ridge Reservation End Use Working Group, have participated in the development of and endorse the above recommendations.

Wolf Naegele — Joan Canning — [signature]

Barbara A. Walton — Tammy B Phillips — Claudia H. Lever

Hema Velacheri — John P Byrne — _____

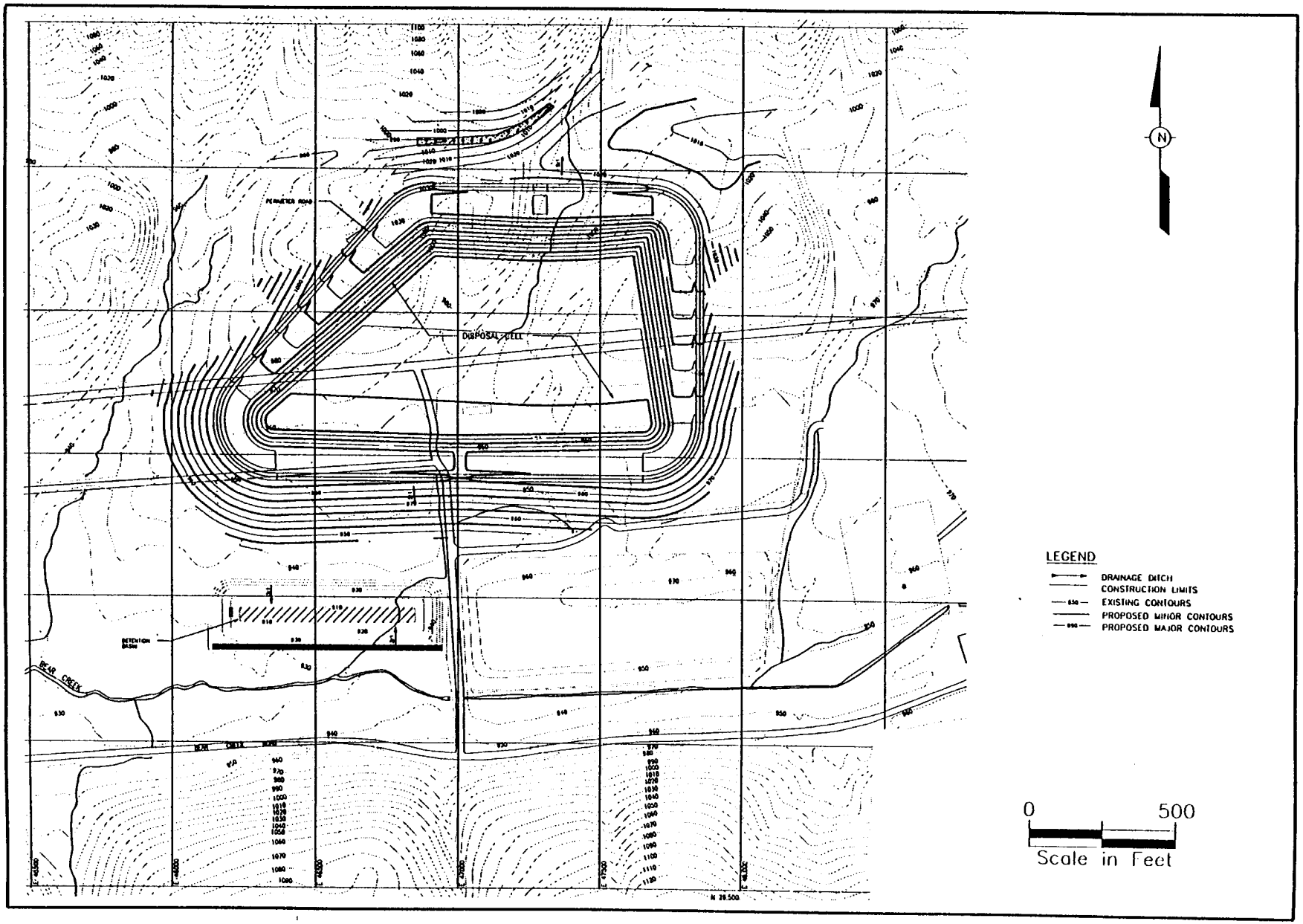
Roger L. Macklin — James D Johnson Jr — _____

Andy Kelly — Alfred H. Brooks — _____

Robert Belle — William M Parker — _____

Mary Bryan — Karen F. Legal — _____

September 19, 1997


PERIMETER ROAD
DISPOSAL CELL
BEAR CREEK
LEGEND
DRAINAGE DITCH
CONSTRUCTION LIMITS
EXISTING CONTOURS
PROPOSED MINOR CONTOURS
PROPOSED MAJOR CONTOURS
N
0
500
Scale in Feet

OAK RIDGE RESERVATION
END USE
WORKING GROUP

MINORITY OPINION REGARDING THE RECOMMENDATION TO SITE A WASTE DISPOSAL FACILITY ON THE OAK RIDGE RESERVATION

While understanding the need and convenience of a Waste Disposal Facility on the Oak Ridge Reservation, it is believed that there will be management problems with DOE. Oak Ridge could become a dump site for other States, and future generations will be facing cleanup again. Part of the EUWG guidelines is to clean it up and keep it clean.

We the undersigned members to the Oak Ridge Reservation End Use Working Group, have participated in the development of and endorse the above minority opinion.

Jane Humphrey

Sandra Reid

Mary Bryan

Wolf Nagel

Jean Rainey

June 25, 1998

OAK RIDGE RESERVATION
END USE
WORKING GROUP

END USE RECOMMENDATIONS FOR BEAR CREEK VALLEY

Bear Creek Valley is divided into three zones (see attached map). Zone III begins with the S-3 Ponds at the western edge of the Y-12 Plant and continues west past the Bear Creek Burial Grounds. It includes approximately 1,000 acres of which 200 acres were used for waste disposal from 1943 to 1993. Most of the contaminated areas are north of Bear Creek Road. In this zone, the nature of the contamination, and the costs, worker risks, and uncertainties associated with its excavation, transport, and disposal lead the End Use Working Group to recommend that Zone III lands be safely maintained under restricted use. Remediation in Zone III must reduce the migration of contamination sufficient to bring contaminants in Zone II to within acceptable levels for unrestricted use and protect Zone I for unrestricted use in perpetuity.

Zone II includes the land west of the Bear Creek Burial Grounds for a distance of approximately one mile. Contaminants in ground and surface water in this zone exceed naturally-occurring levels. Thus, Zone II must be restricted to DOE controlled or recreational end uses until contaminants in ground and surface waters are within acceptable levels.

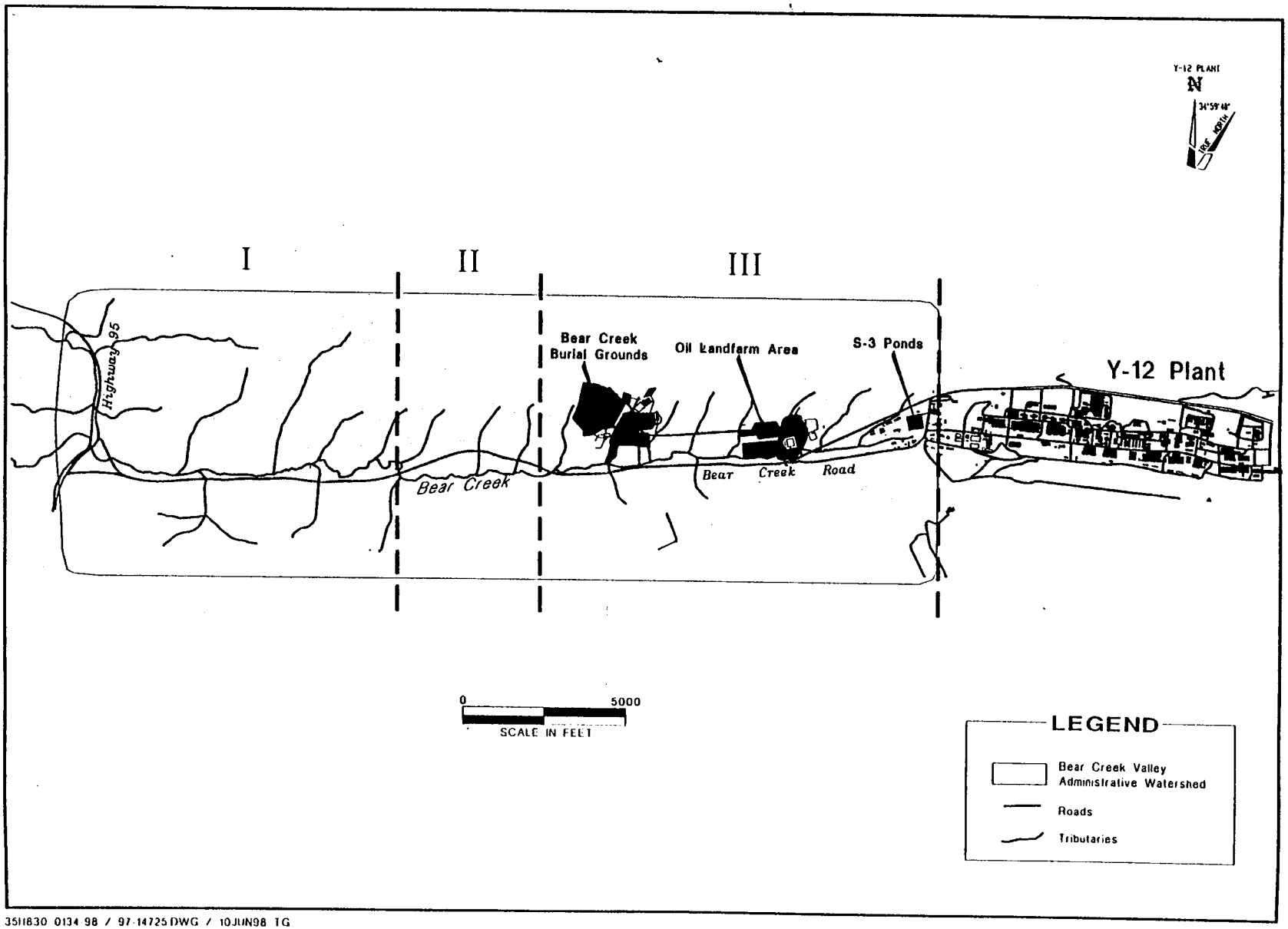
Zone I is immediately adjacent to and west of Zone II. Land and water in this zone are free from contamination and available for unrestricted use.

Implementation of these recommendations by DOE must be consistent with the End Use Working Group Community Guidelines. If DOE cannot meet these end uses for Bear Creek Valley, exceptions must be discussed in a public forum as part of the decision-making process.

We, the undersigned members to the Oak Ridge Reservation End Use Working Group, have participated in the development of and endorse the above recommendations.

Lorene L. Sigal
John Boyd
Claudia H. Lewis
Bob Peelle
Jane Humphrey
Howard Coleman
William M Pardue
Andy Kelley
James D Johnson
Alfred Brooks
Barbara A. Walton
Mary Bryan
Roger L. Macklin
Jean Cunningham
Wolf Naegele
Jay B Phillips

October 2, 1997



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OAK RIDGE RESERVATION
END USE
WORKING GROUP

END USE RECOMMENDATIONS FOR THE DISPOSAL AREAS IN MELTON VALLEY

Some of the most highly radioactive waste materials on the Oak Ridge Reservation are buried in Melton Valley disposal areas. Consideration of any near-term land use other than "restricted" for contaminated Melton Valley lands would require removal of more than 3 million cubic yards of material. The resulting disposal requirements and ecological devastation make such an option unacceptable. Thus, the End Use Working Group recommends restricted end use for the disposal areas in Melton Valley. Because contaminated areas in Melton Valley are not contiguous, some areas of Melton Valley are usable for DOE-controlled activities.

For this end use, DOE must, at a minimum, ensure worker safety and control further migration of contamination in Melton Valley to ensure that levels of contaminants released to the Clinch River via White Oak Dam do not exceed standards protective of human health and the environment.

DOE should continue to monitor the major sources of radiological risk in Melton Valley. Such monitoring will indicate when the contaminants have decayed to levels at which additional remediation is feasible. Radionuclides with half lives of several years to decades, such as tritium, strontium, and cesium, are the major sources of risk in parts of the disposal areas. Within 100 to 300 years, such areas may be candidates for land uses other than restricted.

Implementation of these recommendations by DOE must be consistent with the End Use Working Group Community Guidelines and its recommendations on stewardship. If DOE cannot meet these recommendations for Melton Valley, exceptions must be discussed in a public forum as part of the decision-making process.

We, the undersigned members to the Oak Ridge Reservation End Use Working Group, have participated in the development of and endorse the above recommendations.

Lorene L. Sigal — John P Byrne — Andy Kleber

Hannah Wood — Claudia H. Lever

Barbara A. Walton — Wolf Naegeli

Robert Pelle — William M Pardue

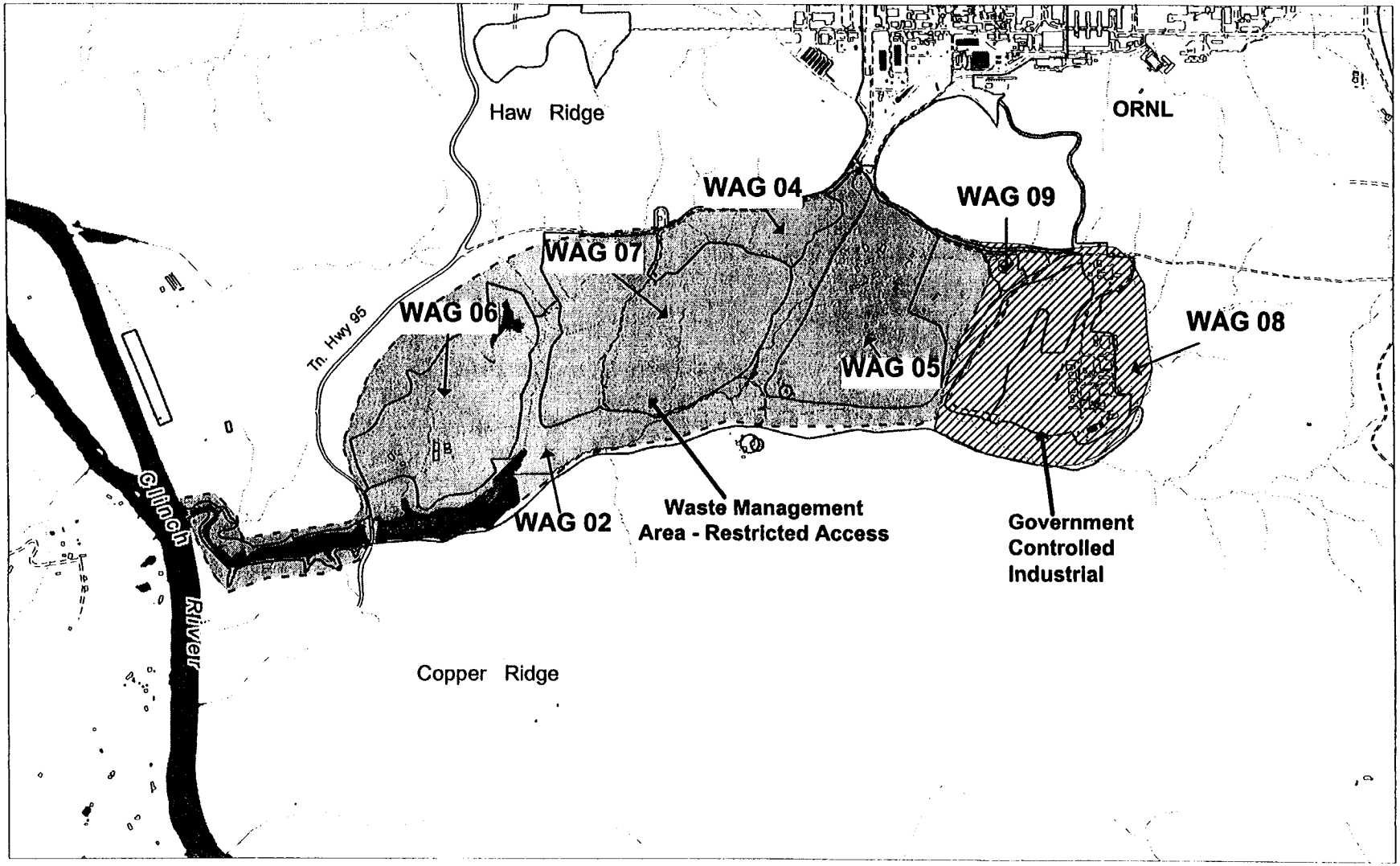
Jean Ramsey — Alfred G. Brooks

Richard A. Mathis — Roger L. Macklin

Charles A. Washington — Jay Edwards

Norman A Nicholson — Jane Humphrey

November 13, 1997



End Use Map of Melton Valley

OAK RIDGE RESERVATION
END USE
WORKING GROUP

END USE RECOMMENDATIONS FOR THE Y-12 PLANT, CHESTNUT RIDGE, AND UPPER EAST FORK POPLAR CREEK

Using the industrial complex at the Y-12 Plant in a manner that is safe and protective of human health and the environment is important to the long-term vitality of the Oak Ridge community. For the foreseeable future, ongoing missions for the Y-12 Plant and Chestnut Ridge dictate the use for much of this property.

For purposes of end use recommendations, the EUWG has divided the Y-12 Plant into two areas (see map). In the eastern area of the plant, surface soils contain relatively low levels of contamination and this area can be made suitable for uncontrolled industrial development. This area is bounded by residential and commercial property.

In the western area of the plant, surface soils are more heavily contaminated and would require significant excavation for uncontrolled industrial use. In addition, ongoing national security missions are located in the western area of the plant, which requires that it remain under federal government control. This area of the plant is bounded to the west by the Bear Creek Valley waste disposal areas.

The Chestnut Ridge area, adjacent to the Y-12 Plant to the south, is used for a variety of waste management activities and contains closed and active landfills.

Contaminated groundwater plumes flow beneath much of the Y-12 property and off-site into Union Valley to the east. Recognition of the impacts of contamination from the Y-12 Plant and Chestnut Ridge on surface water and groundwater resources is essential to planning overall remediation.

The End Use Working Group makes the following recommendations (numbers do not imply priority):

1) The western area of the Y-12 Plant is expected to remain controlled industrial property. As opportunity arises, national security activities should be concentrated in the western area to allow for the broadest possible use of the rest of the plant.

2) The eastern area of the Y-12 Plant should be made suitable for uncontrolled industrial use.

3) Lake Reality and the RCRA-closed New Hope Pond will require continued federal government control. Use of these sites should be consistent with end uses for the eastern area of the Y-12 Plant (i.e., for parking or other non-intrusive uses).

4) The Chestnut Ridge property should continue to be used and safely maintained for regulated waste disposal for the Oak Ridge Reservation.

5) The Upper East Fork Poplar Creek, its tributaries, and surface waters on Chestnut Ridge must eventually meet State water quality standards. In the interim, water quality must not pose an unacceptable risk to: a) industrial workers at the Y-12 Plant, and b) residential and commercial users surrounding the Lower East Fork Poplar Creek and its tributaries.

6) Contaminated groundwater from the Y-12 Plant and Chestnut Ridge must be controlled by the federal government such that it does not permanently impact the use of currently uncontaminated groundwater.

Short-term control and long-term remediation of contaminated source areas must be assured regardless of who is responsible for the facility. Implementation of these recommendations by the DOE must be consistent with the End Use Working Group Community Guidelines and its recommendations for stewardship. If DOE cannot meet these recommendations for the Upper East Fork Poplar Creek Watershed, exceptions must be discussed in a public forum as part of the decision-making process.

We, the undersigned members to the Oak Ridge Reservation End Use Working Group, have participated in the development of and endorse the above recommendations.

Lorene F. Sigal — Alfred A. Brooks

Richard A. Mattis — Roger L. Macklin

Jana F. Humphrey — [illegible]

[illegible] — William M. Parker

Barbara A. Walton — Wolf Naegele

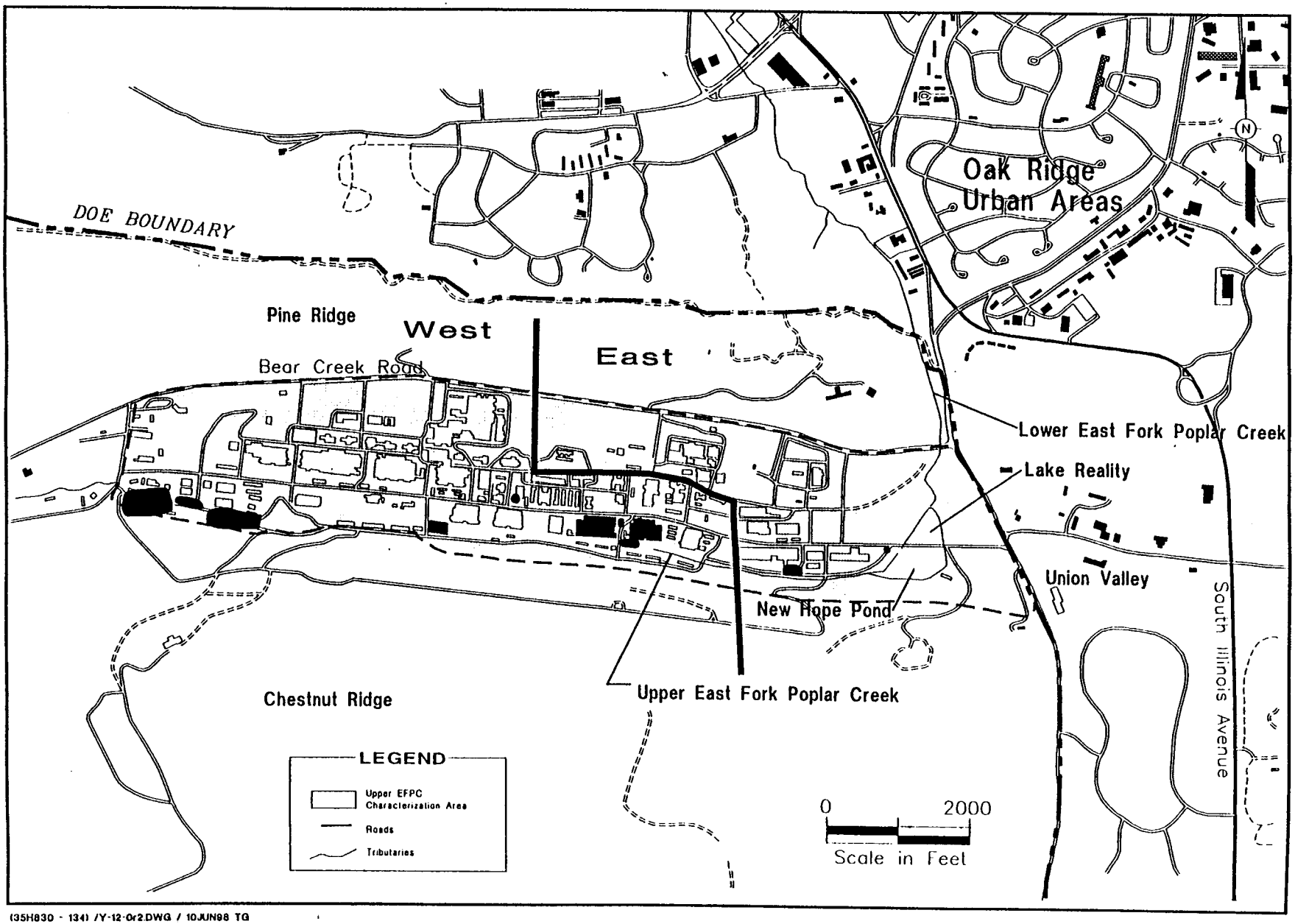
James L. Johnson Jr. —

Andy Kelsey —

Claudia H. Reeves —

Robert Peelle —

May 7, 1998



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OAK RIDGE RESERVATION
END USE
WORKING GROUP

END USE RECOMMENDATIONS FOR THE FORMER K-25 SITE AT THE EAST TENNESSEE TECHNOLOGY PARK

Using the former K-25 Site at the East Tennessee Technology Park (ETTP) in a manner that is safe and protective of human health and the environment is important to the long-term vitality of the Oak Ridge community. The End Use Working Group (EUWG) discussed but did not evaluate and is not commenting on the current reindustrialization process or the Toxic Substances Control Act (TSCA) Incinerator. The EUWG recommendations apply to the former K-25 Site following remediation.

The EUWG recognizes that the federal government will maintain ownership of the property and will be responsible for managing all residual contamination and other stewardship actions.

The Remedial Investigation for ETTP has not been completed, and these end use recommendations are based on preliminary information regarding the scope and extent of contamination.

For purposes of end use recommendations, the EUWG has divided the former K-25 Site into three zones (see map). Zone 1 constitutes property along the Clinch River including the former power plant area; this area is the least developed and least contaminated of the former K-25 Site considered by the EUWG. Zone 2 consists of the former gaseous diffusion process and administration areas. Zone 3 consists of the former support area.

The End Use Working Group makes the following recommendations (numbers do not imply priority):

1. Zone 1 should be remediated to allow for uncontrolled industrial end use, with a focus on natural resource conservation.
2. Zone 2 should be remediated to provide for uncontrolled industrial end use.
3. Zone 3 should be remediated to provide for controlled industrial end use. If the existing K-1070 B and K-1070 C/D waste disposal areas in Zone 3 cannot be fully remediated to controlled industrial end use, then these areas should be maintained as restricted access waste disposal properties and should be managed to ensure the safety of surrounding populations and the environment.
4. The continued storage of UF_6 is not compatible with these recommended end uses. This incompatibility should be resolved on a schedule that coincides with the planned remediation of the site.

Implementation of these recommendations by DOE must be consistent with the End Use Working Group Community Guidelines and its recommendations for stewardship. If DOE cannot meet these recommendations for the former K-25 Site, exceptions must be discussed in a public forum as part of the decision-making process.

We, the undersigned members to the Oak Ridge Reservation End Use Working Group, have participated in the development of and endorse the above recommendations.

Lorene S. Sigal

Roger L. Macklin

Barbara A. Walton

Willis M Pardue

Robert Peelle

Jean S Johnson

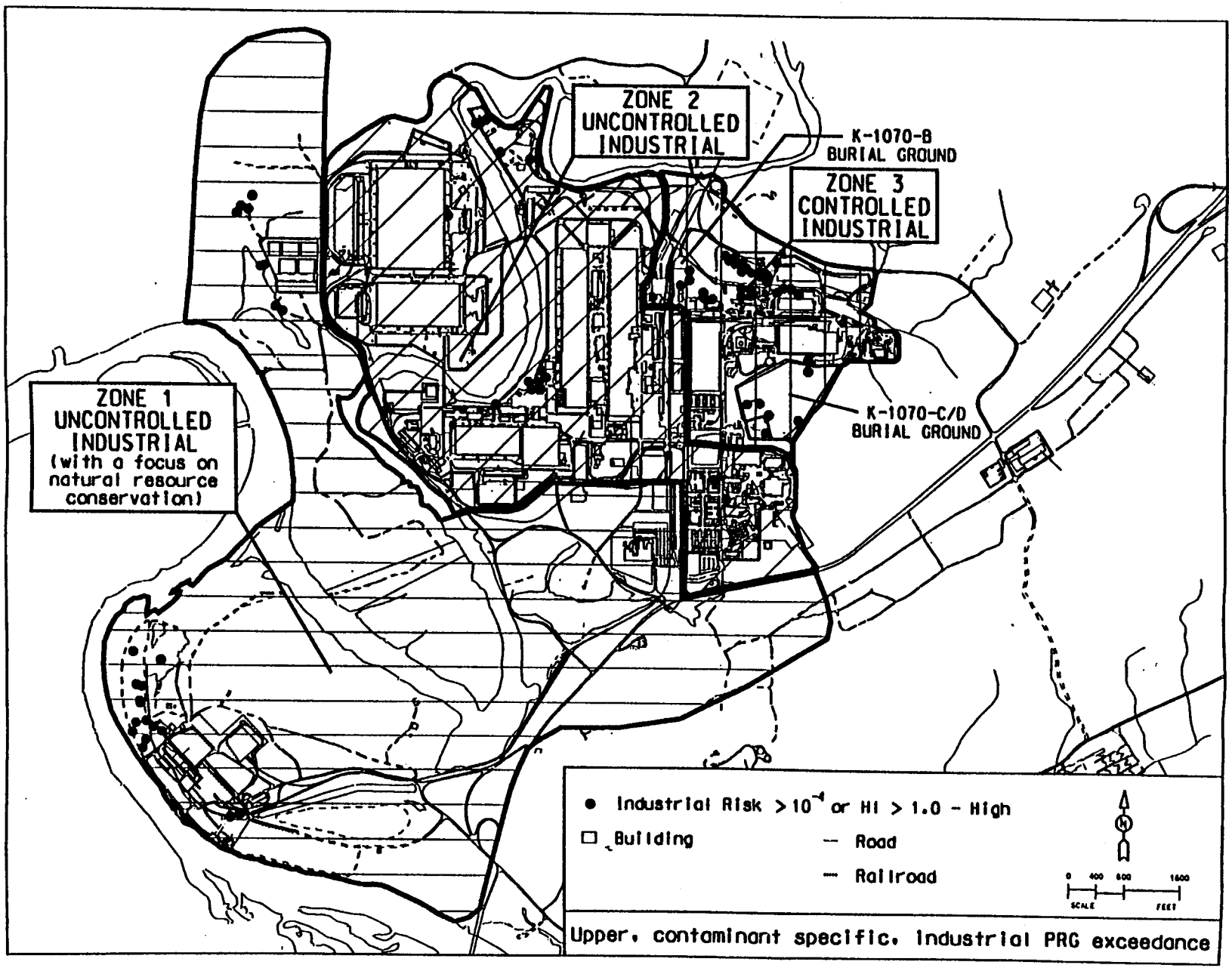
Andy Kelsey

Richard A. Mathis

Alfred A. Brock

Claudia L. Lewis

June 11, 1998


ZONE 2
UNCONTROLLED
INDUSTRIAL
K-1070-B
BURIAL GROUND
ZONE 3
CONTROLLED
INDUSTRIAL
ZONE 1
UNCONTROLLED
INDUSTRIAL
(with a focus on
natural resource
conservation)
K-1070-C/D
BURIAL GROUND
Industrial Risk > 10⁻⁴ or HI > 1.0 - High
Building
Road
Railroad
N
0 400 800 1600
SCALE FEET
Upper, contaminant specific, industrial PRG exceedance

OAK RIDGE RESERVATION
END USE
WORKING GROUP

MINORITY OPINION REGARDING THE END USE RECOMMENDATIONS FOR THE FORMER K-25 SITE AT THE EAST TENNESSEE TECHNOLOGY PARK

Presentations of preliminary risk assessment results conducted by DOE's contractors were made to the End Use Working Group. Of note were areas of unacceptable risk in surface soils under the industrial exposure scenario at locations where buildings are being leased or planned to be leased under current reindustrialization plans. As noted in the recommendation, the Remedial Investigation for ETTP is just beginning; it is possible that other areas of unacceptable risk will be identified over the course of the Remedial Investigation. In addition, a number of workers from the former K-25 site are sick. The cause(s) of their illnesses has not been identified, but the TSCA incinerator has the potential to be at least one source of contaminants that could be causing illness.

Under the CERCLA process, areas of unacceptable risk must be cleaned up to safe levels for current and future use exposure scenarios. The EUWG chose not to comment on the current reindustrialization plans for ETTP or the use of the TSCA incinerator. However, we must go on record as saying that it is unconscionable for the Department of Energy to lease buildings to new industries in an area when their own risk assessments indicate that risks are unacceptable under current conditions. The number of sick workers from the site corroborate their assessment. Reindustrialization of the former K-25 site should not occur until the Remedial Investigation is completed, areas of unacceptable risk are identified and controlled until they can be remediated, and the cause(s) of the illnesses are identified and corrected.

We the undersigned members to the Oak Ridge Reservation End Use Working Group, have participated in the development of and endorse the above minority opinion.

Mary Bryan _____ _____

Jane Humphrey _____ _____

Sandra Reed _____ _____

Jean Ramsey _____ _____

Barbara A. Walton _____ _____

Wolf Naegel _____ _____

June 25, 1998

OAK RIDGE RESERVATION
END USE
WORKING GROUP

END USE RECOMMENDATION FOR SITES NOT INCLUDED IN THE EXISTING ADMINISTRATIVE WATERSHEDS

During its deliberations, the End Use Working Group (EUWG) was unable to study a number of sites whose remediation is being considered separately from the five existing administrative watersheds. These sites include but are not limited to:

1. White Wing Scrap Yard
2. Molten Salt Reactor Experiment facility
3. High Flux Isotope Reactor
4. Homogenous Reactor Experiment facility
5. Cesium Plots

The EUWG recommends that DOE use the Community Guidelines in making future end use decisions for such sites. Particular attention should be given to selecting an end use that is consistent with end uses of adjacent property.

In particular, because the White Wing Scrap Yard is surrounded by uncontaminated land, it should be remediated to allow for unrestricted use.

Use of the reactor sites in Melton Valley should be consistent with Melton Valley recommendations for government-controlled industrial use. In addition, the Cesium Plots lend themselves to remediation that allows for an unrestricted end use.

We, the undersigned members to the Oak Ridge Reservation End Use Working Group, have participated in the development of and endorse the above recommendations.

June 11, 1998

APPENDIX E
End Use Working Group Community Guidelines

OAK RIDGE RESERVATION
END USE
WORKING GROUP

COMMUNITY GUIDELINES FOR DETERMINING END USES OF CONTAMINATED LAND AND WATER ON THE OAK RIDGE RESERVATION

The End Use Working Group believes end use decisions for the Oak Ridge Reservation, and associated remedial activities, must include consideration of the community's values. The public and the Department of Energy (DOE) have a mutual responsibility to deal with each other openly and honestly. To enable stakeholders to comment responsibly on end use and remediation options, DOE must provide accurate and timely information.

DOE's Environmental Management Program should be guided by end use recommendations that are provided by the stakeholder community, are endorsed by the City of Oak Ridge and can accommodate changing circumstances. Once end use recommendations are provided by the community, the federal government should commit to completing all remediation to meet recommended end uses and should provide opportunities for meaningful public involvement. The federal government's goal should always be the protection of human health and the environment. In its decision making, the federal government should use the best available science and technology, while taking into account cultural, social and economic factors, environmental justice and risks to workers.

The End Use Working Group developed the following guidelines for DOE to use in making future use decisions for contaminated land and water. The guidelines for contaminated land are presented in order of priority. Each guideline for contaminated water carries equal weight. DOE should explain how the guidelines are incorporated or cannot be incorporated into each of its decisions.

Guidelines for Contaminated Land

1. All owners and operators of property must, at a minimum, comply with applicable state and federal regulations to provide safe working conditions and to protect nearby residents and the environment.
2. Contaminated material left on site, regardless of the site's end use, must be controlled to prevent further spread.
3. The federal government should work with state and local governments, in consultation with the public, to establish and fund a long-term stewardship program for contaminated lands.
4. DOE and its contractors should minimize impacts on the environment during remediation and maximize restoration of the environment after remediation.
5. End uses for lands containing residual contamination should include buffer zones that protect current and future nearby populations.
6. End use decisions for contaminated lands should allow for the safe use and development of Oak Ridge Reservation lands, future employment, and research opportunities.
7. When siting additional facilities, DOE should use brownfield sites instead of greenfield sites.
8. Structures unsuitable for future uses should be demolished expeditiously.
9. Waste should be relocated only to reduce total risks to human population and the environment.

10. Institutional controls in lieu of remedial actions should be used only in cases where DOE has satisfied the community that further restoration is not feasible.
11. DOE's program offices must coordinate their activities and end use decisions and should provide for meaningful, broad-based public involvement.
12. End use decisions should be reevaluated as better technologies become available.
13. End use decisions should strive to reduce the amount of land requiring long-term control.
14. End use of contaminated sites should be compatible with projected uses of adjacent properties.

Guidelines for Contaminated Water

1. The federal government must assure the unrestricted use of groundwater exiting the boundaries of the Oak Ridge Reservation.
2. The federal government must control contaminated groundwater resulting from Oak Ridge Reservation activities such that the use of currently uncontaminated groundwater is not impacted. Where it is necessary to restrict the use of uncontaminated groundwater to prevent the expansion of contaminant plumes, the goal of remediation should be to expeditiously eliminate those restrictions.
3. If contaminated groundwater remains after remediation, the federal government must restrict its use and prevent the contamination from spreading.
4. Where contaminated groundwater exists beneath otherwise uncontaminated land, the goal should be to restore that groundwater to health-based standards.
5. Surface waters on the Oak Ridge Reservation must eventually meet State water quality standards. In the interim, water quality must not pose an unacceptable risk under actual current use.

It should be noted that these Community Guidelines complement, but do not alter, the nine CERCLA (Comprehensive Response, Compensation and Liability Act) criteria that must be considered by DOE, the U.S. Environmental Protection Agency and the Tennessee Department of Environment and Conservation. These CERCLA criteria are:

Overall protection of human health and the environment
Compliance with ARARs
Long-term effectiveness and permanence
Reduction of toxicity, mobility or volume
Short-term effectiveness
Implementability
Cost
Regulatory acceptance
Community acceptance

APPENDIX F
Section 120(h)(3) of CERCLA

Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended through September 25, 1996

Title 42 U.S. Code
CHAPTER 103
SUBCHAPTER I
SEC. 9620. FEDERAL FACILITIES

(h) Property transferred by Federal agencies

(1) Notice
After the last day of the 6-month period beginning on the effective date of regulations under paragraph (2) of this subsection, whenever any department, agency, or instrumentality of the United States enters into any contract for the sale or other transfer of real property which is owned by the United States and on which any hazardous substance was stored for one year or more, known to have been released, or disposed of, the head of such department, agency, or instrumentality shall include in such contract notice of the type and quantity of such hazardous substance and notice of the time at which such storage, release, or disposal took place, to the extent such information is available on the basis of a complete search of agency files.

(2) Form of notice; regulations
Notice under this subsection shall be provided in such form and manner as may be provided in regulations promulgated by the Administrator. As promptly as practicable after October 17, 1986, but not later than 18 months after October 17, 1986, and after consultation with the Administrator of the General Services Administration, the Administrator shall promulgate regulations regarding the notice required to be provided under this subsection.

(3) Contents of certain deeds
(A) In general.—
After the last day of the 6-month period beginning on the effective date of regulations under paragraph (2) of this subsection, in the case of any real property owned by the United States on which any hazardous substance was stored for one year or more, known to have been released, or disposed of, each deed entered into for the transfer of such property by the United States to any other person or entity shall contain–

(i) to the extent such information is available on the basis of a complete search of agency files–
(I) a notice of the type and quantity of such hazardous substances,
(II) notice of the time at which such storage, release, or disposal took place, and
(III) a description of the remedial action taken, if any;

(ii) a covenant warranting that-
(I) all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer, and

(II) any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States; and

(iii) a clause granting the United States access to the property in any case in which remedial action or corrective action is found to be necessary after the date of such transfer.

(B) Covenant requirements.–
For purposes of subparagraph (A)(ii)(I) and (C)(iii), all remedial action described in such subparagraph has been taken if the construction and installation of an approved remedial design has been completed, and the remedy has been demonstrated to the Administrator to be operating properly and successfully. The carrying out of long-term pumping and treating, or operation and maintenance, after the remedy has been demonstrated to the Administrator to be operating properly and successfully does not preclude the transfer of the property.

The requirements of subparagraph (A)(ii) shall not apply in any case in which the person or entity to whom the real property is transferred is a potentially responsible party with respect to such property. The requirements of subparagraph (A)(ii) shall not apply in any case in which the transfer of the property occurs or has occurred by means of a lease, without regard to whether the lessee has agreed to purchase the property or whether the duration of the lease is longer than 55 years. In the case of a lease entered into after September 30, 1995, with respect to real property located at an installation approved for closure or realignment under a base closure law, the agency leasing the property, in consultation with the Administrator, shall determine before leasing the property that the property is suitable for lease, that the uses contemplated for the lease are consistent with protection of human health and the environment, and that there are adequate assurances that the United States will take all remedial action referred to in subparagraph (A)(ii) that has not been taken on the date of the lease.

(C) Deferral.–

(i) In general.–The Administrator, with the concurrence of the Governor of the State in which the facility is located (in the case of real property at a Federal facility that is listed on the National Priorities List), or the Governor of the State in which the facility is located (in the case of real property at a Federal facility not listed on the National Priorities List) may defer the requirement of subparagraph (A)(ii)(I) with respect to the property if the Administrator or the Governor, as the case may be, determines that the property is suitable for transfer, based on a finding that–

(I) the property is suitable for transfer for the use intended by the transferee, and the intended use is consistent with protection of human health and the environment;

(II) the deed or other agreement proposed to govern the transfer between the United States and the transferee of the property contains the assurances set forth in clause (ii);

(III) the Federal agency requesting deferral has provided notice, by publication in a newspaper of general circulation in the vicinity of the property, of the proposed transfer and of the opportunity for the public to submit, within a

period of not less than 30 days after the date of the notice, written comments on the suitability of the property for transfer; and
(IV) the deferral and the transfer of the property will not substantially delay any necessary response action at the property.

(ii) Response action assurances.–
With regard to a release or threatened release of a hazardous substance for which a Federal agency is potentially responsible under this section, the deed or other agreement proposed to govern the transfer shall contain assurances that–
(I) provide for any necessary restrictions on the use of the property to ensure the protection of human health and the environment;
(II) provide that there will be restrictions on use necessary to ensure that required remedial investigations, response action, and oversight activities will not be disrupted;
(III) provide that all necessary response action will be taken and identify the schedules for investigation and completion of all necessary response action as approved by the appropriate regulatory agency; and
(IV) provide that the Federal agency responsible for the property subject to transfer will submit a budget request to the Director of the Office of Management and Budget that adequately addresses schedules for investigation and completion of all necessary response action, subject to congressional authorizations and appropriations.

(iii) Warranty.–
When all response action necessary to protect human health and the environment with respect to any substance remaining on the property on the date of transfer has been taken, the United States shall execute and deliver to the transferee an appropriate document containing a warranty that all such response action has been taken, and the making of the warranty shall be considered to satisfy the requirement of subparagraph (A)(ii)(I).

(iv) Federal responsibility.–
A deferral under this subparagraph shall not increase, diminish, or affect in any manner any rights or obligations of a Federal agency (including any rights or obligations under sections 106, 107, and 120 existing prior to transfer) with respect to a property transferred under this subparagraph.

(4) Identification of uncontaminated property
(A) In the case of real property to which this paragraph applies (as set forth in subparagraph (E)), the head of the department, agency, or instrumentality of the United States with jurisdiction over the property shall identify the real property on which no hazardous substances and no petroleum products or their derivatives were known to have been released or disposed of. Such identification shall be based on an investigation of the real property to determine or discover the obviousness of the presence or likely presence of a release or threatened release of any hazardous substance or any petroleum product or its derivatives, including aviation fuel and motor oil, on the real property. The identification shall consist, at a minimum, of a review of each of the following sources of information concerning the current and previous uses of the real property:

(i) A detailed search of Federal Government records pertaining to the property.
(ii) Recorded chain of title documents regarding the real property.
(iii) Aerial photographs that may reflect prior uses of the real property and that are reasonably obtainable through State or local government agencies.
(iv) A visual inspection of the real property and any buildings, structures, equipment, pipe, pipeline, or other improvements on the real property, and a visual inspection of properties immediately adjacent to the real property.
(v) A physical inspection of property adjacent to the real property, to the extent permitted by owners or operators of such property.
(vi) Reasonably obtainable Federal, State, and local government records of each adjacent facility where there has been a release of any hazardous substance or any petroleum product or its derivatives, including aviation fuel and motor oil, and which is likely to cause or contribute to a release or threatened release of any hazardous substance or any petroleum product or its derivatives, including aviation fuel and motor oil, on the real property.
(vii) Interviews with current or former employees involved in operations on the real property.

Such identification shall also be based on sampling, if appropriate under the circumstances. The results of the identification shall be provided immediately to the Administrator and State and local government officials and made available to the public.

(B) The identification required under subparagraph (A) is not complete until concurrence in the results of the identification is obtained, in the case of real property that is part of a facility on the National Priorities List, from the Administrator, or, in the case of real property that is not part of a facility on the National Priorities List, from the appropriate State official. In the case of a concurrence which is required from a State official, the concurrence is deemed to be obtained if, within 90 days after receiving a request for the concurrence, the State official has not acted (by either concurring or declining to concur) on the request for concurrence.

(C)(i) Except as provided in clauses (ii), (iii), and (iv), the identification and concurrence required under subparagraphs (A) and (B), respectively, shall be made at least 6 months before the termination of operations on the real property.

(ii) In the case of real property described in subparagraph (E)(i)(II) on which operations have been closed or realigned or scheduled for closure or realignment pursuant to a base closure law described in subparagraph (E)(ii)(I) or (E)(ii)(II) by October 19, 1992, the identification and concurrence required under subparagraphs (A) and (B), respectively, shall be made not later than 18 months after October 19, 1992.

(iii) In the case of real property described in subparagraph (E)(i)(II) on which operations are closed or realigned or become scheduled for closure or realignment pursuant to the base closure law described in subparagraph (E)(ii)(II) after October 19, 1992, the identification and concurrence required under subparagraphs (A) and (B), respectively, shall be made not later than 18 months after the date by which a joint resolution disapproving the closure or realignment of the real property under

section 2904(b) of such base closure law must be enacted, and such a joint resolution has not been enacted.

(iv) In the case of real property described in subparagraphs (E)(i)(II) on which operations are closed or realigned pursuant to a base closure law described in subparagraph (E)(ii)(III) or (E)(ii)(IV), the identification and concurrence required under subparagraphs (A) and (B), respectively, shall be made not later than 18 months after the date on which the real property is selected for closure or realignment pursuant to such a base closure law.

(D) In the case of the sale or other transfer of any parcel of real property identified under subparagraph (A), the deed entered into for the sale or transfer of such property by the United States to any other person or entity shall contain–

(i) a covenant warranting that any response action or corrective action found to be necessary after the date of such sale or transfer shall be conducted by the United States; and

(ii) a clause granting the United States access to the property in any case in which a response action or corrective action is found to be necessary after such date at such property, or such access is necessary to carry out a response action or corrective action on adjoining property.

(E)(i) This paragraph applies to–
(I) real property owned by the United States and on which the United States plans to terminate Federal Government operations, other than real property described in subclause (II); and
(II) real property that is or has been used as a military installation and on which the United States plans to close or realign military operations pursuant to a base closure law.
(ii) For purposes of this paragraph, the term "base closure law" includes the following:
(I) Title 11 of the Defense Authorization Amendments and Base Closure and Realignment Act (Public Law 100-526; 10 U.S.C. 2687 note).
(II) The Defense Base Closure and Realignment Act of 1990 (part A of title XXIX of Public Law 101-610 10 U.S.C. 2687 note)
(III) Section 2687 of title 10, United States Code.
(IV) Any provision of law authorizing the closure or realignment of a military installation enacted on or after the date of enactment of the Community Environmental Response Facilitation Act.

(F) Nothing in this paragraph shall affect, preclude, or otherwise impair the termination of Federal Government operations on real property owned by the United States.

(5) Notification of States regarding certain leases
In the case of real property owned by the United States, on which any hazardous substance or any petroleum product or its derivatives (including aviation fuel and motor oil) was stored for one year or more, known to have been released, or disposed of, and on

which the United States plans to terminate Federal Government operations, the head of the department, agency, or instrumentality of the United States with jurisdiction over the property shall notify the state in which the property is located of any lease entered into by the United States that will encumber the property beyond the date of termination of operations on the property. Such notification shall be made before entering into the lease and shall include the length of the lease, the name of person to whom the property is leased, and a description of the uses that will be allowed under the lease of the property and buildings and other structures on the property.

APPENDIX G
Notices to Buyers

- Sellers Disclosure Statement for Acreage and Lots
- Tennessee Residential Property Disclosure Act
- Tennessee Residential Property Condition Disclosure
- Lead-Based Paint Addendum
- Advice to Sellers Concerning Obligations Under Lead-Based Paint Regulations 44 U.S.C. 4852d

SELLERS DISCLOSURE STATEMENT FOR ACREAGE AND LOTS

The following is a disclosure statement made by the Sellers of information concerning the condition of the property located at _____ This disclosure is not a warranty of any kind by the Seller or any Agent of the Seller in this transaction, and is not a substitute for any inspection or warranties Purchaser may wish to obtain.

TO THE SELLERS Please complete this form, including past history of problems, if known. Do not leave any spaces blank. If the condition is not applicable to your property mark "N/A" in the blank. If a condition is unknown, so indicate in the blank. Attach additional pages if additional space is required. Be sure to sign each page.

THE FOLLOWING ARE REPRESENTATIONS BY THE SELLER AND ARE NOT REPRESENTATIONS OF SELLER'S AGENTS.

1. Well or city water systems? (Please circle) If well, type of well (depth/diameter) _____
Age of well? _____ Any known problems or repairs? _____
Has the water been treated? ( )Yes ( ) No. If yes, date of last report? _____
Results? _____

2. Septic tanks/drain fields or city sewer system? (Please circle) Any known problems or repairs? _____

3. Are you aware of any other area environmental concerns such as discoloration of soil or vegetation or oil sheen in wet areas? _____

4. Are you aware of any principal uses of the property other than residential, such as commercial use, dumping site, farming, etc.? _____

5. Features of the property shared in common with adjoining landowners, such as wells, fences, ponds and driveways, whose use and/or responsibility for maintenance may have an effect on the property: ( )Unknown ( )No ( )Yes, describe _____

6. Any rights of way, easements or similar matters that may effect your interest in the property? ( )Unknown ( )No ( )Yes, describe _____

7. Settling, flooding, drainage, grading or soil problems? ( )Unknown ( )No ( )Yes, describe _____

8. Major damage to the property from fire, wind, flood or landslides: ( )Unknown ( )No ( )Yes, describe _____

9. Any zoning violations or nonconforming uses? ( )Unknown ( )No ( )Yes, describe _____

10. Is there a homeowner's association which has authority over the property? ( )Unknown ( )No ( )Yes, describe _____

11. Any "common areas" (facilities such as pools, tennis courts, walkways, or other areas co-owned in undivided interest with others)? ( )Unknown ( )No ( )Yes, describe _____

12. Please state any other facts or information relating to this property that would be of concern to a Purchaser _____

To the extent of Seller's knowledge as a property owner, Seller acknowledges that the information contained above is true and accurate for those areas of the property listed.

SELLER _____ DATE _____

SELLER _____ DATE _____

Purchaser is urged to carefully inspect the property and, if desired, to have the property inspected by an expert. Purchaser understands that there are areas of the property for which Seller has no knowledge and that this disclosure statement does not encompass those areas. Purchaser also acknowledges that he/she/they has read and received a signed copy of this statement from Seller or Seller's Agent.

PURCHASER _____ DATE _____

PURCHASER _____ DATE _____

INFORMATION CONCERNING THE

TENNESSEE RESIDENTIAL PROPERTY DISCLOSURE ACT

On April 17, 1994, the governor signed into law the Tennessee Residential Property Disclosure Act. The Act passed with very little opposition. Generally, the Seller must provide very detailed information concerning the condition of the property.

Whether or not a Realtor is involved in the sale, compliance is mandatory. The law also requires that both the Purchaser and Seller be provided information concerning their rights and obligations under this Act.

SUMMARY

The following is a summary of the provisions of the Tennessee Residential Property Disclosure Act:

For one to four family residential property, prior to signing a Real Estate Sales contract or certain other Agreements, the Seller must provide detailed information concerning the condition of the property.

The Disclosure Statement is not a warranty and is not intended to be a substitute for an independent inspection.

The Disclosure is provided for the Buyer's exclusive use and may not be relied upon by a Buyer in a subsequent transfer.

The Disclosure must be given in good faith.

The Seller is not required to undertake independent inspections or investigations of the property in order to complete the Disclosure. The Buyer may wish to obtain an inspection. The information in the Disclosure is provided by the Seller and not the real estate professional.

The Disclosure may be waived by a Disclaimer, but only if the Buyer agrees.

Failure to provide a Disclaimer will not permit a Buyer to terminate a Real Estate Sales Contract; however, the Buyer may have other remedies.

The Seller is not liable for an error or omission in the Disclosure if:

(1) The error or omission was not within the actual knowledge of the Seller or was based on information provided by a public agency, or the report of an inspector such as a professional home inspector; and

(2) The Seller was not grossly negligent in obtaining the information.

If the Seller subsequently (but before the closing) determines that the information in the Disclosure was inaccurate, the Seller must disclosure the inaccuracy to the Buyer. In addition, if there are any material changes in the physical condition of the property between the time the contract is executed and the closing, then an updated Disclosure is required.

At the time of closing, the Seller will be required to provide a statement that no physical changes have occurred in the condition of the property between the time of the Execution of the Disclosure and the date of closing.

If at the time the Disclosure is made the Seller does not have information concerning a certain matter, the Seller may state that such information is unknown, or, use an approximation of the information, but this provision may not be used for the purpose of evading the purpose of the Act.

The real estate professional must inform potential Buyers of adverse facts concerning the property known to him/her, and can be held liable for intentional misrepresentation or defrauding a Buyer.

Matters such as a person being infected with HIV or other disease which has been determined by medical evidence to be highly unlikely to be transmitted through occupancy of a residence, or the occurrence at the residence of a homicide, felony or suicide need not be disclosed.

The Buyer has a cause of action for defects existing at the time of the execution of the Contract, subject to certain limitations. Any action must be brought within one year.

No cause of action may be instituted against a closing agent or attorney for failure of a Seller to provide a Disclosure or Disclaimer.

Failure of a Seller to provide the Disclosure or Disclaimer does not affect the status of the title. The Act does not affect other remedies otherwise available.

Certain transactions are excluded from the Disclosure requirements.

AGENT:

DELIVERED THIS _____DAY OF _____, 199____.

AGENT/FIRM:

BY:_____ Name (typed or printed):_____

Name (above signed)

SELLER/BUYER:

I HEREBY ACKNOWLEDGE RECEIPT OF THIS INFORMATION FORM AND THAT THE ABOVE-NAMED REAL ESTATE AGENT HAS PROVIDED ME WITH A STATEMENT OF MY RIGHTS AND OBLIGATIONS UNDER THE TENNESSEE RESIDENTIAL PROPERTY DISCLOSURE ACT.

ACKNOWLEDGED THIS _____DAY OF _____, 199____.

_____ Name (typed or printed):_____

Name (above signed)

TENNESSEE RESIDENTIAL PROPERTY CONDITION DISCLOSURE

The Tennessee Residential Property Disclosure Act states that anyone transferring title to residential real property must provide information about the condition of the property. This completed form constitutes that disclosure by the Seller. This is not a warranty, or a substitute for any professional inspections or warranties that the purchasers may wish to obtain.

Instructions to the Seller: Complete this form yourself and answer each question to the best of your knowledge. If any answer is an estimate, clearly label it as such. The Seller hereby authorizes any agent(s) representing any party in this transaction to provide a copy of this statement to any person or entity in connection with any actual or anticipated sale of the subject property.

Property Address _____ City _____

Seller's Name(s) _____ Property Age _____

Date Seller acquired the Property _____ Do You Occupy the Property? _____
If not owner-occupied, how long has it been since the seller occupied the property? _____

A. The subject property includes the items checked below

___Range	___Oven	___Central Air Conditioning	___ Garage Door Opener(s)
___Intercom	___Microwave	___Window Screens	___ Sump Pump
___Dishwasher	___Rain Gutters	___Hot Tub	___TV Antenna/Satellite Dish
___Pool	___Garbage Disposal	___Sauna	___Fireplace(s)(Number___)
___Spa/Whirlpool Tub	___Trash Compactor	___Gas Starter for Fireplace	___Water Softener
___220 Volt Wiring	___Burglar Alarm	___Smoke Detector/Fire Alarm	___Washer/Dryer Hookups
___Central Heating	___Irrigation System	___Patio/Decking/Gazebo	___Access to Public Street
___Heat Pump	___Current Termite Contract	___Wall/Window Air Conditioning	

•Other _____

Garage:	___Attached	___Not Attached	___Carport	
Water Heater:	___Gas	___Solar	___Electric	
Water Supply:	___City	___Well	___Private Utility	Other _____
Waste Disposal	___City Sewer	___Septic	Other _____	
Gas Supply:	___Utility	___Bottled	Other _____	

Roof(s) Type _____ Age (approx) _____
Other Items: _____

To the best of your knowledge, are any of the above NOT in operating condition? ___Yes ___No
If YES, then describe (attach additional sheets if necessary): _____
_____
_____

B. Are you (Seller) aware of any significant defects/malfunctions in any of the following?

Interior Walls	___Yes ___No ___Unknown	Electrical System	___Yes ___No ___Unknown
Ceilings	___Yes ___No ___Unknown	Exterior Walls	___Yes ___No ___Unknown
Floors	___Yes ___No ___Unknown	Roof	___Yes ___No ___Unknown
Windows	___Yes ___No ___Unknown	Basement	___Yes ___No ___Unknown
Doors	___Yes ___No ___Unknown	Foundation	___Yes ___No ___Unknown
Insulation	___Yes ___No ___Unknown	Slab	___Yes ___No ___Unknown
Plumbing	___Yes ___No ___Unknown	Driveway	___Yes ___No ___Unknown
Sewer/Septic	___Yes ___No ___Unknown	Sidewalks	___Yes ___No ___Unknown

If any of the above is/are marked YES, please explain: _____
_____
_____

C. Are you (Seller aware of any of the following?

1. Substances, materials, or products which may be an environmental hazard such as, but not limited to: asbestos, radon gas, lead-based paint, fuel or chemical storage tanks, and/or contaminated soil or water on the subject property.
   ___Yes ___No ___Unknown
2. Features shared in common with adjoining landowners, such as walls, fences, and driveways, whose use or responsibility for maintenance may have an effect on the subject property. ___Yes ___No ___Unknown

3. Any authorized changes in roads, drainage, or utilities affecting the property, or contiguous to the property. ___Yes ___No ___Unknown
4. Any changes since the most recent survey of this property, was done? ___Yes ___No ___Unknown
5. Any encroachments, easements, or similar items that may affect your ownership interest in the subject property. ___Yes ___No ___Unknown
6. Room additions, structural modifications, or other alterations or repairs made without necessary permits. ___Yes ___No ___Unknown
7. Room additions, structural modifications, or other alterations or repairs made not in compliance with building codes. ___Yes ___No ___Unknown
8. Landfill (compacted or otherwise) on the property or any portion thereof. ___Yes ___No ___Unknown
9. Any settling from any cause, or slippage, sliding, or other soil problems. ___Yes ___No ___Unknown
10. Flooding, drainage or grading problems. ___Yes ___No ___Unknown
11. A flood insurance requirement. ___Yes ___No ___Unknown
12. Major property or structural damage from fire, earthquake, floods, or landslides. ___Yes ___No ___Unknown
13. Any zoning violations, nonconforming uses, and/or violations of "setback" requirements. ___Yes ___No ___Unknown
14. Neighborhood noise problems or other nuisances. ___Yes ___No ___Unknown
15. Subdivision and/or deed restrictions or obligations. ___Yes ___No ___Unknown
16. A Homeowners Association (HOA) which has any authority over the subject property. ___Yes ___No ___Unknown
    Name of HOA: _____
    HOA Address: _____
    Monthly Dues: _____ Special Assessments: _____
17. Any "common area" (facilities such as pools, tennis courts, walkways, or other areas co-owned in undivided interest with others) ___Yes ___No ___Unknown
18. Any notices of abatement or citations against the property. ___Yes ___No ___Unknown
19. Any lawsuit(s) against the seller threatening to or affecting this real property. ___Yes ___No ___Unknown
20. Is any system, equipment or part of the property being leased? ___Yes ___No ___Unknown. If yes, please explain and include a written statement regarding payment information.
21. Any exterior wall covering of the structure(s) covered with exterior insulation and finish systems (EIFS), also known as "synthetic stucco". ___Yes ___No ___Unknown If yes, has there been a recent inspection to determine whether the structure has excessive moisture accumulation and/or moisture related damage? (The Tennessee Real Estate Commission urges any buyer or seller who encounters this product to have a qualified professional inspect the structure in question for the preceding concern and provide a written report of the profession's finding.

If the answer to any of the above is YES please explain: _____
_____

D. CERTIFICATION: I/we certify that the information herein, concerning the real property located at _____ _____, is true and correct to the best of my/our knowledge as of the date signed. Should any of these conditions change prior to conveyance of title to this property, these changes will be disclosed in addenda to this document.

_____ _____
Transferor (Seller) Date

_____ _____
Transferor (Seller) Date

Parties may wish to obtain professional advice and/or inspections of the property and to negotiate appropriate provisions in the purchase agreement regarding advice, inspections, or defects.

TRANSFEREE/Buyer's Acknowledgment: I/we understand that this disclosure statement is not intended as a substitute for any inspection, and that I/we have a responsibility to pay diligent attention to and inquire about those material defects which are evident by careful observation.

I/we understand that the information contained in the disclosure is the representation of the owner and is not the representation of the real estate licensee or sales person, if any.

I/we acknowledge receipt of a copy of this disclosure.

_____ _____
Transferee (Buyer) Date

_____ _____
Transferee (Buyer) Date

ADVICE TO SELLERS CONCERNING OBLIGATIONS UNDER LEAD-BASED PAINT REGULATIONS 44 U.S.C. 4852d

Effective September 6, 1996 for owners of more than five residential units and effective December 6, 1996 for all other owners, new HUD/EPA regulations require detailed disclosure concerning lead-based paint. Pursuant to those regulations, real estate professionals involved in the transaction must provide certain information to the Seller(s).

The regulations are long and detailed.

Sellers must first complete a disclosure as to the presence of any known lead-based paint and/or lead-based paint hazard in residential dwellings which were constructed prior to January 1, 1978. Sellers must provide copies of any available records or reports pertaining to the presence of lead-based paint and/or lead-based paint hazards.

Sellers are required to use reasonable efforts to obtain these records.

Purchasers are to be provided with a Federal approved lead-based paint hazard information pamphlet which the real estate professional must insure is presented.

Contracts for residential units constructed prior to January 1, 1978 must include a provision which allows the Purchaser to obtain an inspection of the property up to ten days (or a mutually agreed upon period of time) from contract ratification. If there is a determination as to the presence of lead-based paint and/or lead-based paint hazards then the parties to the contract may: (1) agree as to remediation efforts, (2) waive remediation or (3) make other arrangements. If an agreement is not reached, then the contract will be null and void and the earnest money deposit will be returned to the Purchaser.

The regulations also require that certain specified language be inserted in the Offer To Purchase warning potential Purchasers as to the dangers of lead-based paint.

The penalties for non-compliance are severe. Civil penalties can range up to $10,000.00 for each violation and those who knowingly and willfully violate the law can be fined $10,000.00 for each violation and imprisoned for up to one year, or both. There may be state law provisions concerning lead-based paint in addition to the civil penalties and imprisonment. Sellers may be liable for injuries sustained by the Purchaser. **The regulations provide for treble damages.**

This is to certify that I have informed the Seller(s) as to the provisions of the regulations.

REALTY EXECUTIVES OF OAK RIDGE

_____

Listing Agent Date

We, the undersigned Sellers, acknowledge that we have been informed by our agent as to the provisions of the HUD/EPA regulations concerning lead-based paint.

_____ _____

Seller Date Seller Date

APPENDIX H
Components of a Proposed Stewardship Information System

Stewardship Repository
The Stewardship Repository is the working repository of all manner of reports, documents, maps, approvals, data collections, and other types of information generated by the remediation and stewardship process. The Repository should be maintained and preserved by the principal steward or its contractor, since most of the information will be produced by contractors of the principal steward (i.e., DOE). It is important that the repository be available to the public in some manner.

Abstracts and Indexing
Information collections and archives are of little value over the long-term without indexing and abstracting services to facilitate accessibility. For this reason, the principal steward should initiate steps to have the topic of stewardship added to two or more ongoing indexing and abstracting services serving at least the physical and environmental sciences and the waste management subject area. The appropriately selected subset of these indices can be the source of indices to be included on a web site. The principal steward should ensure that proper indexing and abstracting are maintained in the long-term.

Information Archives
Working repositories, to be efficient, must be of limited size. Therefore, selected material must be transferred into long-term archives, either as hard copy, microfiche, or computer-accessible form. It is important that this material be accessible through indices and abstracts. It is particularly important that the information not be lost or destroyed until the need for it is clearly gone. Due to the nature of the data and its relation to a long-term problem, this period may be longer than is usual for this type of information or its disposal may be determined by different criteria. In any event the principal steward must ensure that the proper storage and disposal criteria are established. There should be two or more long-term archives, one of which should be the National Technical Information Service and the other established in Oak Ridge.

Site Access and Activities Controls
These controls relate to such activities as hunting, fishing, and other recreation that may be allowed on the contaminated land. The information would include such things as the hunting season and game inspection requirements as well as the existence of advisories and fish consumption limits.

Stewardship Internet Web Site
This Stewardship Information System component is to ensure accessibility. The site should contain graphics, videos, report summaries, indexing and abstracting, and other attractive information modes. It should appeal to both younger and older generations, and provide entrance to more serious repositories.

Public Library Collection
Public libraries should maintain a collection, provided by the principal steward, of documents relating to the history of remediation, the need and long-term plans for stewardship and other stewardship topics of general public interest. The principal steward should plan these documents and other media to meet the long-term stewardship needs of the library and the public. Library computers will supply public access to the stewardship web site.

School Library Collection
This component is similar to that of the public library but should be structured to facilitate the education of students about the need for and nature of stewardship. The teachers should contribute to the definition of this collection. The school computers will supply access to the web site.

Public Awareness
This includes: 1) legal notices of the changing status of land, 2) meetings to inform the public of the changing status of sites especially if risk changes, and 3) other forms of public awareness.

County Records - Register of Deeds

This county office is currently the official repository for all manner of documents concerning ownership and restrictions on real property. The information is suitably indexed for title searches, which are routinely carried out to establish the ability of each seller to transfer a clear title of the land to the buyer of the property. Almost any document establishing an encumbrance against the property can be recorded. This includes deeds with restrictions, easements and access rights, deeds to subsurface rights, and evidence of a host of other encumbrances. The stewardship program would use a selection of institutional controls pertaining to the presence of waste and the evidence of these would be recorded as an encumbrance against the property. The CERCLA requirement of Section 120 (h) (3) (see Appendix F) that DOE issue a warranty deed creating its perpetual responsibility as well as supplying associated contaminant information assures that the requisite information for stewardship is available.

Currently, parcel maps for developed land parcels in Oak Ridge are approved by the Oak Ridge Regional Planning Commission and are recorded for public record. In a similar manner, a parcel map of contaminated land as described by City Ordinance, and categorized by the Oak Ridge Regional Planning Commission for special industrial future use, could be entered into the public record. A title search would disclose encumbrances on the property. Deliberate action would be required to remove such encumbrances from the property at a future date. (See below for additional description.)

City Records – Oak Ridge Regional Planning & Community Development Office

The Oak Ridge Regional Planning and Community Development Office is currently charged with implementation and enforcement of the City ordinances dealing with land use and thus are a logical location for the City's role in controlling the future use of contaminated lands. Central to this function is the creation, by City ordinance, of new industrial use land zones, at least one of which is for long-term industrial waste disposal. This land use would also require 1) the preparation of a parcel map showing the location of the waste, 2) a document describing the waste and the restrictions on the future use of the land, and 3) the recording of these documents with the County Register of Deeds.

The above would be initiated while land is still in the ownership of the federal government. Any subsequent change of use or ownership would be accompanied by appropriate parcel maps, documents and recordings. These new actions would come under the umbrella of current actions of the City of Oak Ridge.

The city records would contain a working duplicate of all pertinent information contained in the county records and possibly additional information.

The City Tax Records could be augmented with a notation of the presence of waste. This is primarily to increase redundancy and alert searchers to the need for further inquiry.

State Parcel Maps

The Tennessee State Parcel Mapping Systems is vested in the Tennessee Finance and Administration, Office of Information Resources and is supported by the Office of Management Services of the Comptroller of the Treasury. The work is being done under the direction of Mark Tuttle, Director of Geographic Information System (GIS) Services (Phone: 615-741-9356). Ms. Brenda Brandenburg (615-741-7704) of the Office of Management Services of the Comptroller of the Treasury did much of the early work and remains involved as does the Comptrollers Office. The GIS is to become the working repository for the State's land planning and management functions. It is also intended to have a public interface. The GIS could easily add an industrial waste disposal thematic layer to permanently record the location and nature of the DOE waste areas. Most of the data are currently in the Oak Ridge National Laboratory GIS databases and could easily be transferred to the State system. Currently, plans are being laid to input digitized

data for Roane County utilizing students from the Roane State Community College, under the guidance of Pat Luther of SAIC and Roane State (481-4727). Digitizing data for DOE land in Anderson County would be a new effort.

This component adds redundancy to the Stewardship Information System and provides a public interface to the stewardship information in a system devoted to land management and land planning.

Notices to Buyers

This component comprises the State Notices to Buyers, which inform buyers of the condition of property being sold. The State would have to include the existence of industrial waste as another required notice applicable to all parcels. These notices are retained by realtors for three years and thus are not a long-term information repository. They only provide information to new owners. (See Appendix G for examples of Notices.)